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User Manual

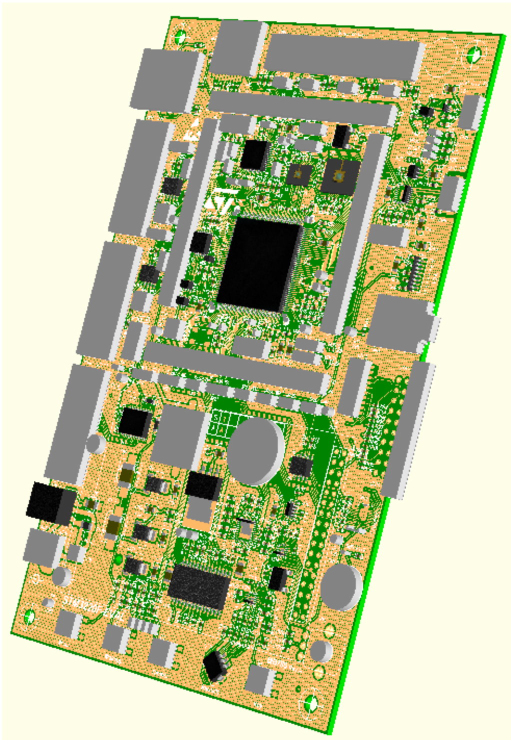
STM3220F-EVAL
Evaluation Board

Introduction

The STM32F207IFT6 evaluation board STM3220F-EVAL is designed as complete development platform for STMicroelectronic's ARM Cortex-M3 core-based STM32F207IFT6 microcontroller with digital camera module interface, High speed USB OTG, Full speed USB OTG, Ethernet MAC, FSMC interface, two channels of CAN2.0A/B compliant interface, 2 channels I2S, 3 channels I2C, 6 channels USART with smart card support, 3 channels SPI, SDIO, 3 ADC, 2 DAC, internal 128KB SRAM and 1MB Flash, JTAG&SWD debugging support.

The full range of hardware features on the board is able to help you evaluate all peripherals (USB OTG HS, USB OTG FS, Ethernet, Motor Control, CAN, MicroSD card, Smart card, USART, Audio DAC, RS232, IrDA, PSRAM, OneNAND, MEMS, EEPROM… etc.) and develop your own applications. Extension headers make it possible to easily connect a daughter board or wrapping board for your specific application.

Figure 1: **STM3220F-EVAL evaluation board**



Features

- Four 5V power supply options: Power jack, USB FS connector, USB HS connector or daughter board.
- Boot from User Flash, System memory or SRAM.
- I2S Audio DAC, stereo audio jack.
- 1GByte or more MicroSD card.
- Both type A&B Smart card support.
- I2C compatible serial interface 64KBit EEPROM, MEMS and IO Expander.
- RS232 communication.
- IrDA transceiver.
- USB OTG HS and FS with Micro-AB connector.
- IEEE-802.3-2002 compliant Ethernet connector.
- Camera module
- 4Mbit PSRAM
- 512Mbit OneNAND
- Two channels of CAN2.0A/B compliant connection.
- Inductor Motor Control connector.

- JTAG ,SW and Trace Debug support.
- 3.2” 240x320 TFT color LCD with touch screen.
- Joystick with 4-direction control and selector.
- Reset, Wakeup, Tamper and User button.
- 4 color LEDs.
- RTC with backup battery.
- MCU consumption measurement circuit
- Extension connector for daughter board or wrapping board.

Contents

1. Hardware Layout and configuration

The STM3220F-EVAL evaluation board is designed around the STM32F207IFT6 in 176-pin TQFP package. The hardware block diagram Figure 2 illustrates the connection between STM32F207IFT6 and peripherals (Camera module, LCD, PSRAM, OneNAND, EEPROM, MEMS, USART, IrDA, USB OTG HS, USB OTG FS, Ethernet, Audio, CAN bus, Smart card, MicroSD card and Motor Control) and Figure 3 will help you locate these features on the actual evaluation board.

Figure 2: Hardware Block Diagram

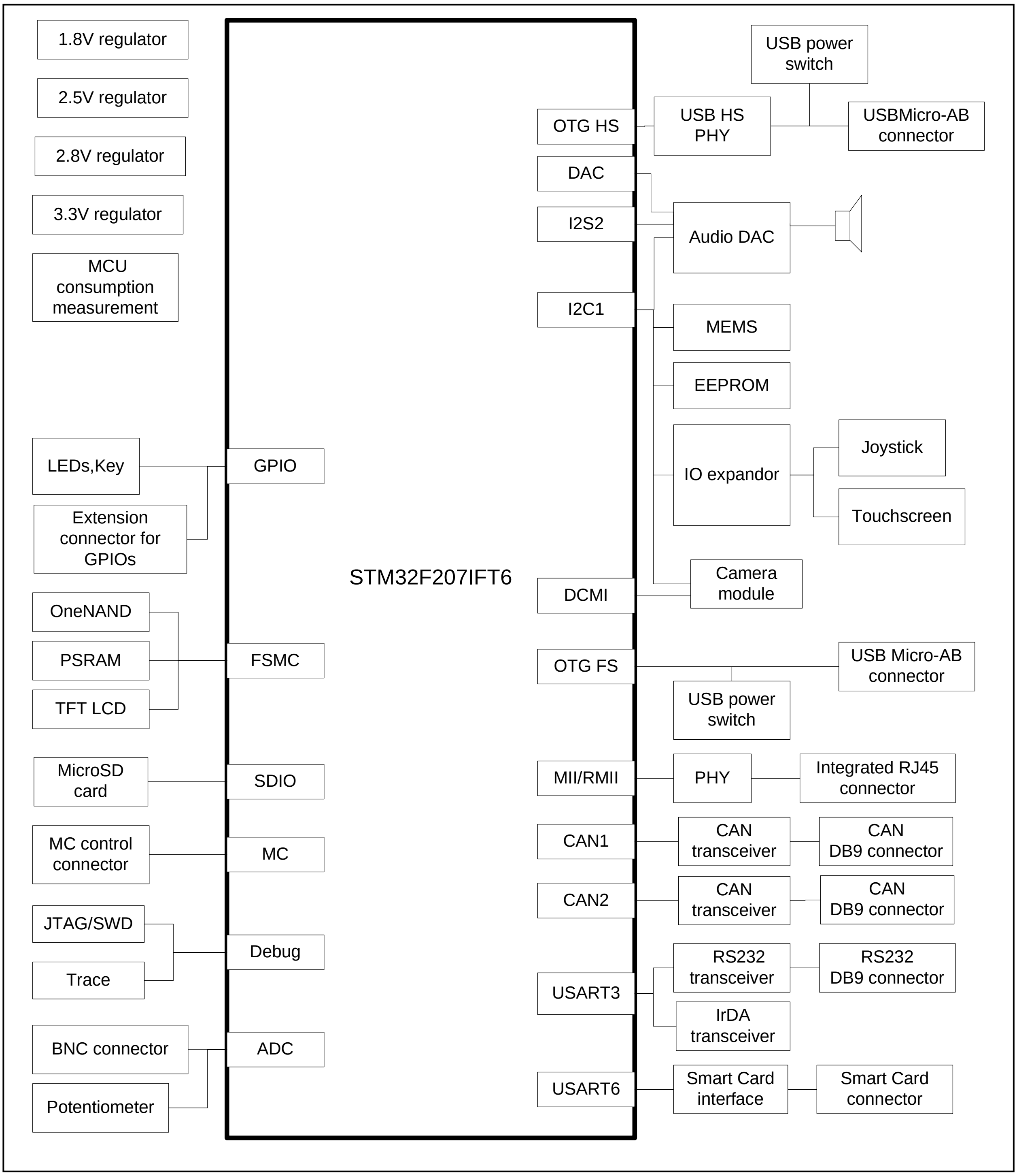
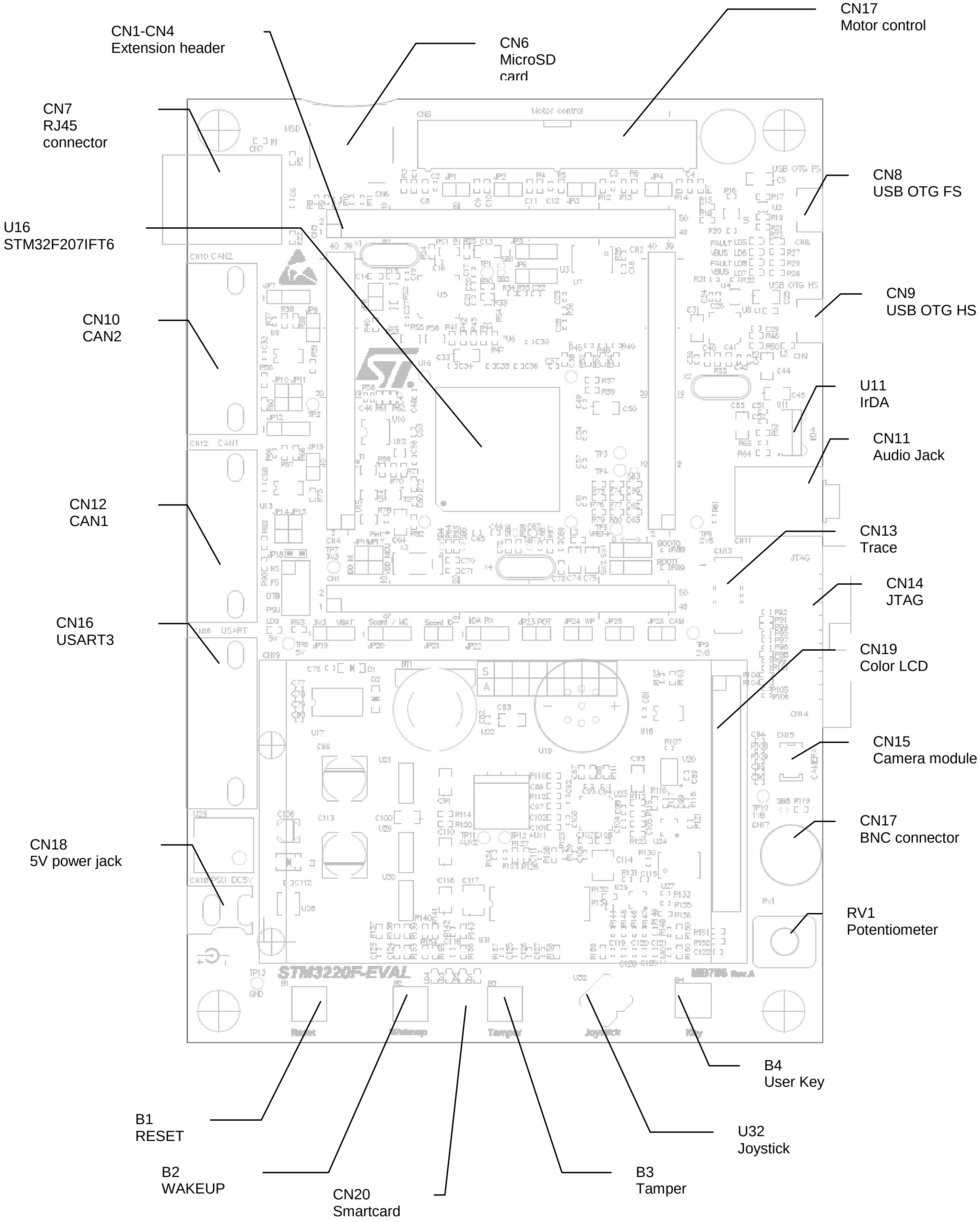


Figure 3: STM3220F-EVAL Evaluation board layout



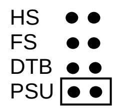
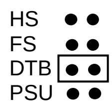
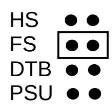
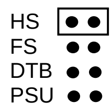
1.1 Power Supply

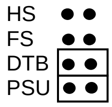
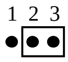
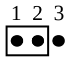
STM3220F-EVAL evaluation board is designed to be powered by 5V DC power supply and to be protected by PolyZen from wrong power plug-in event. It's possible to configure the evaluation board to use any of following Four sources for the power supply.

- 5V DC power adapter connected to CN18, the Power Jack on the board (PSU on silk screen for Power Supply Unit).
- 5V DC power with 500mA limitation from CN8, the USB OTG FS Micro-AB connector (FS on silkscreen).
- 5V DC power with 500mA limitation from CN9, the USB OTG HS Micro-AB connector (HS on silkscreen).
- 5V DC power from both CN1 and CN3, the extension connector for daughter board (DTB for Daughter Board on silkscreen).

The power supply is configured by setting the related jumpers **JP17, JP18 & JP19** as described in table 1.

Table 1 Power related Jumpers

Jumper	Description
JP17	JP17 is used to measure MCU current consumption manually by multi-meter. Default setting: Fitted
JP18	JP18 is used to select one of the four possible power supply resources. For **power supply jack**(CN18) to the STM3220F-EVAL <u>only</u>, JP18 is set as shown to the right: (Default Setting) 
	For power supply from the **daughter board connectors**(CN1 and CN3) to STM3220F-EVAL <u>only</u>, JP18 is set as shown to the right: 
	For power supply from USB OTG FS (CN8) to STM3220F-EVAL <u>only</u>, JP18 is set as shown to the right: 
	For power supply from USB OTG HS (CN9) to STM3220F-EVAL <u>only</u>, JP18 is set as shown to the right: 

	For power supply from **power supply jack**(CN18) to both STM3220F-EVAL and daughter board connected on CN1 and CN3, JP18 is set as shown to the right (**daughter board must not have its own power supply connected**) 
JP19	Vbat is connected to battery when JP19 is set as shown to the right: 
	Vbat is connected to 3.3V power when JP19 is set as shown to the right: (Default setting) 

To enable MCU power consumption measurement, JP16 should be re-configured as described in table 2.

Table 2 MCU Power consumption measurement related Jumpers

JP16	JP16 is useded to bypass MCU power consumption measurement circuit, it's set to close by default. JP16 need to be re-configured to open for MCU power consumption measurement. Default setting: Fitted

The LED LD9 is lit when the STM3220F-EVAL evaluation board is powered by the 5V correctly.

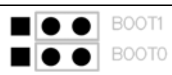
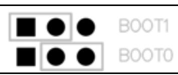
1.2 Boot Option

The STM3220F-EVAL evaluation board is able to boot from:

- Embedded User Flash
- System memory with boot loader for ISP
- Embedded SRAM for debugging

The boot option is configured by setting switch SW1 (BOOT1) and SW2 (BOOT0). The BOOT0 can be configured also via RS232 connector CN16.

Table 3 Boot related Switch

Switch	Boot from	Switch configuration
BOOT0 & 1	STM3220F-EVAL boot from **User Flash** when BOOT0 is set as shown to the right. BOOT1 is don't care in this configuration. (Default setting)	
	STM3220F-EVAL boot from **Embedded SRAM** when BOOT0 and BOOT1 are set as shown to the right.	
	STM3220F-EVAL boot from **System Memory** when BOOT0 and BOOT1 are set as shown to the right.	

1.3 Clock Source

Four clock sources are available on STM3220F-EVAL evaluation board for STM32F207IFT6 and RTC embedded.

- X1, 25MHz Crystal for Ethernet PHY.
- X2, 24MHz Crystal for USB OTG HS PHY.
- X3, 32KHz Crystal for embedded RTC.
- X4, 25MHz Crystal with socket for STM32F207IFT6 Microcontroller, it can be removed from socket when internal RC clock is used.

1.4 Reset Source

The reset signal of STM3220F-EVAL evaluation board is low active and the reset sources include:

- Reset button B1
- Debugging Tools from JTAG connector CN14 and Trace connector CN13
- Daughter board from CN3
- RS232 connector CN16 for ISP.

Table 4 Reset Related Jumpers

Jumper	Description
JP25	Enable reset of the STM32F207IFT6 embedded JTAG TAP controller each time a system reset occurs. JP25 connects the TRST signal from the JTAG connection with the system reset signal RESET#. Default Setting: Not fitted

1.5 Audio

STM3220F-EVAL evaluation board supports stereo audio play thanks to an audio DAC CS43L22 connected to both I2S2 port and one channels of DAC of microcontroller STM32F207IFT6. The CS43L22 can be configured via I2C1. The automatically switch between the speaker and headphone is supported by both CS43L22 and audio jack with plug detection pin.

1.6 EEPROM

A 64KBit EEPROM connected to I2C1 bus of STM32F207IFT6.

Table 5 EEPROM Related Jumpers

Jumper	Description
JP24	The EEPROM is in Write protection mode when JP24 is closed. Default Setting: Not fitted

1.7 CAN

STM3220F-EVAL evaluation board supports two channels of CAN2.0A/B complaint CAN bus communication based on 3.3V CAN transceiver. The two CAN bus are disabled and disconnected by jumpers from relevant STM32F207IFT6 IO's which are shared with FSMC and USB OTG HS. The jumper JP14 and JP15 must be re-set to enable CAN1 while JP10 and JP11 must be re-set to enable CAN2 as listed in table 6 and table 7.

The High-speed mode, standby mode and slope control mode are available and can be selected by setting JP12 for CAN1 and JP7 for CAN2.

Table 6 CAN1 related Jumpers

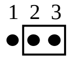
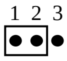
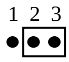
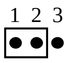
Jumper	Description
JP12	CAN1 transceiver is working in standby mode when JP12 is set as shown to the right: 
	CAN1 transceiver is working in high-speed mode when JP12 is set as shown to the right: (default setting) 
	CAN1 transceiver is working in slope control mode when JP12 is open.
JP13	CAN1 terminal resistor is enabled when JP13 is fitted. Default setting: Not fitted
JP14	CAN1_TX is connected to PD1 and all peripherals connected to FSMC (LCD, PSRAM & OneNAND) are disabled when JP14 is closed. Default setting: Not fitted
JP15	CAN1_RX is connected to PD0 and all peripherals connected to FSMC (LCD, PSRAM & OneNAND) are disabled when JP15 is closed. Default setting: Not fitted

Table 7 CAN2 related Jumpers

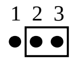
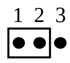
Jumper	Description
JP7	CAN2 transceiver is working in standby mode when JP7 is set as shown to the right: 
	CAN2 transceiver is working in high-speed mode when JP7 is set as shown to the right: (default setting) 
	CAN2 transceiver is working in slope control mode when JP7 is open.
JP9	CAN2 terminal resistor is enabled when JP9 is fitted. Default setting: Not fitted
JP10	CAN2_TX is connected to PB13 and USB OTG HS is disabled when JP10 is closed. JP10 must be open for USB OTG HS application. Default setting: Not fitted
JP11	CAN2_RX is connected to PB5 and USB OTG HS is disabled when JP11 is closed. JP11 must be open for USB OTG HS application. Default setting: Not fitted

1.8 RS232 & IrDA

Both RS232 and IrDA communication is supported by D-type 9-pins RS232 connectors CN16 and IrDA transceiver U11 which are connected to USART3 of STM32F207IFT6 on STM3220F-EVAL evaluation board. Two signals, Bootloader_BOOT0 and Bootloader_RESET, are added on RS232 connector for ISP support.

RS232 or IrDA can be selected by setting of JP22:

Table 8 RS232 & IrDA Related Jumpers

Jumper	Description
JP22	USART3_RX is connected to IrDA transceiver and IrDA communication is enabled when JP22 is set as shown to the right: 
	USART3_RX is connected to RS232 transceiver and RS232 communication is enabled when JP22 is set as shown to the right(Default setting): 
	JP22 must be set to open to enable MicroSD card witch shares same IOs with RS232.

1.9 Motor Control

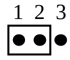
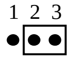
STM3220F-EVAL evaluation board supports three-phase brushless motor control via a 34-pins connector CN17, which provides all required control and feedback signals to and from motor power-driving board. Available signals on this connector includes emergency stop, motor speed, 3 phase motor current, bus voltage, Heatsink temperature coming from the motor driving board and 6 channels of PWM control signal going to the motor driving circuit.

JP2 allows to choose two kind to synchronization methods for PFCs (Power Factor Correction).

The I/O pins used on Motor control connector CN17 are multiplexed with some peripherals on the board; either motor control connector or multiplexed peripherals can be enabled by setting of jumpers **JP4, JP20 and JP3**:

Table 9 Motor Control Related Jumpers

Jumper	Description
JP2	JP2 allows to have a PFC synchronization signal redirected to the timer 3 input capture 2 pin, additionally to the timer3 external trigger input. Default setting: Not Fitted
JP1	JP1 should be kept on open when encoder signal is input from pin31 of CN5 while it should be kept on close when analog signal is from pin31 of CN5 for special motor. Default setting: Not Fitted
SB3	Solder bridge SB3 is closed by default to connect BNC connector and Motor control connector to PF8. For external analog input connected to TP3 and TP4, SB3 may be disconnected. It allows to connect an analogue source to ADC for accuracy and reliability evaluation with minimum noise induced by components on the board. Default setting: close

Jumper	Description	Multiplexed peripherals
JP20	MC_BusVoltage is connected to PF6 when JP20 is set as shown to the right:  SmartCard_OFF is connected to PF6 when JP20 is set as show to the right (Default setting): 	Smart card
JP3	MC_HeatsinkTemperature is connected to PF7 when JP3 is closed. JP3 must be open for Smart card. Default setting: Not Fitted	
JP4	MC_EmergencySTOP is connected to PI4 when JP4 is closed. Default setting: Not Fitted	Camera module connected to CN15

Note: MicroSD card must be removed from CN6 for Motor control application.

1.10 Smart Card

STMicroelectronics Smart card interface chip ST8024 is used on STM3220F-EVAL board for asynchronous 3V and 5V smart cards. It performs all supply protection and control functions based on the connections with STM32F207IFT6 listed in table 10:

Table 10 Connection between ST8024 and STM32F207IFT6

Signals of ST8024	Description	Connect to STM32F207IFT6
5V/3V	Smart card power supply selection pin.	PH15
I/OUC	MCU data I/O line	PC6
XTAL1	Crystal or external clock input	PG7
OFF	Detect presence of a card, Interrupt to MCU, share same pin with Motor controller	PF6
RSTIN	Card Reset Input from MCU	PF7
CMDVCC	Start activation sequence input (Active Low), share same pin with I2S DAC and Motor control	PG12

Smart card shares some IO's with Motor control connector CN5 and I2S bus for Audio. Some jumper has to be re-configured to enable Smartcard as listed below:

Table 11 Smartcard Related Jumpers

Jumper	Description
JP21	SmartCard_IO is connected to PC6 when JP21 is closed. JP21 must be open for Audio DAC connected to I2S. Default setting: Not Fitted
JP3 & JP20	Description of JP3 and JP20 is in chapter 1.9 Motor control.

1.11 MicroSD card

The 1GByte or more MicroSD card connected to SDIO of STM32F207IFT6 is available on the board. MicroSD card Detection is managed by standard IO port PH13. MicroSD card shares same IO's with Motor control & RS232. The jumper JP22 must be open and Motor control connector (CN6) must be disconnected for MicroSD card.

Table 12 MicroSD card related Jumpers

Jumper	Description
JP22	Description of JP22 is in chapter 1.8 RS232 & IrDA.

1.12 MEMS

A ST MEMS device LIS302DL is connected to I2C1 bus of STM32F207IFT6 on the board.

1.13 Analog Input

One BNC connectors CN17 is connected to PF8 of STM32F207IFT6 as external analog input when Motor control connector is not used. The 50 ohm terminal resistor can be enabled by closing of solder bridge SB8. A low pass filter can be implemented for BNC connector by replacing of R74 and C59 with right value of resister and capacitor as requested by end user's application.
Note: For ADC accuracy measurement please use TP3 & TP4 as described in table 9 on chapter 1.9

There are also 2 analog signals available on the board:

1. 10K ohm potentiometer RV1 connected to PC2 via jumper JP23.
2. IDD measurement output signal connected to PF9 for power consumption test in RUN, SLEEP and STOP mode.

Table 13 Potentiometer related Jumpers

Jumper	Description
JP23	Potentiometer RV1 is connected to PC2 when JP23 is closed. JP23 must be open for Ethernet application. Default setting: Not fitted
SB8	The 50ohm terminal resistor is enabled when SB8 is closed. Default setting: open

1.14 USB OTG FS

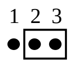
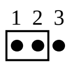
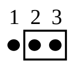
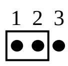
STM3220F-EVAL evaluation board support USB OTG full speed communication via a USB Micro-AB connector (CN8) and USB power switch (U1) connected to VBUS. The evaluation board can be powered by this USB connection at 5V DC with 500mA current limitation.

The LED LD6 will be light when power switch (U1) is ON and STM3220F-EVAL works as a USB host or if VBUS is powered by another USB host when STM3220F-EVAL works as a USB device. The LD5 will be light when over-current is occurred.

1.15 Ethernet

STM3220F-EVAL evaluation board support 10M/100M Ethernet communication by a PHY DP83848CVV (U5) and integrated RJ45 connector (CN7). Both MII and RMII interface mode are supported and can be selected by setting of jumpers JP5, JP6 and JP8 as listed below:

Table 14 Ethernet Related Jumpers and solder bridges

Jumper	Description
JP8	JP8 is used to select MII or RMII interface mode. MII is enabled when JP8 is open while RMII interface mode is enabled when JP8 is close. Default setting: Not Fitted
JP6	JP6 should be set as shown to the right when MII interface mode is enabled(Default setting): 
	JP6 should be set as shown to the right when RMII interface mode is enabled: 
JP5	25MHz clock for MII or 50MHz clock for RMII is provided by MCO at PA8 when JP5 is set as shown to the right (Default setting): 
	25MHz clock is provided by external crystal X1 (for MII interface mode only) when JP5 is set as shown to the right: 
	JP5 has to be kept open when clock is provided by external oscillator U3 (not fit by default)
JP23	Description of JP23 is in chapter 1.13 Analog Input.
SB1	SB1 is used to select clock source only for RMII mode, the clock from MCO is connected to RMII_REF_CLK when SB1 is closed. Default setting: open
SB2	SB2 is used to select clock source only for RMII mode, the clock from pin25 of Ethernet PHY U5 is connected to RMII_REF_CLK when SB2 is closed. Default setting: close

A tes tpoint TP2 is available on the board for PTP_PPS feature test, it can be used only when JP11 is kept on open. (Note: there are no problem of conflict between PTP_PPS output & ULPI data bus, pls. refer to 6.1.9.3 interface protection of USB3300. TBC)

1.16 USB OTG HS

STM3220F-EVAL evaluation board support USB OTG High speed communication via a USB Micro-AB connector (CN9), USB High speed PHY (U8) and USB power switch (U4) connected to VBUS. The evaluation board can be powered by this USB connector (CN9) at 5V DC with 500mA current limitation.

The LED LD7 will be light when power switch (U4) is ON and STM3220F-EVAL works as a USB host or if VBUS is powered by another USB host when STM3220F-EVAL works as a USB device. The LD8 will be light when over-current is occurred.

The USB ULPI bus is shared with CAN2 bus, the JP10 and JP11 must be kept on open for USB OTG HS.

1.17 Camera Module

A 1.3Mega Pixel camera module is connected to DCMI bus of STM32F207IFT6 and shares same IOs with motor control connector. JP4 must be kept on open for Camera module application.

Table 15 Camera module Related Jumpers

Jumper	Description
JP26	The camera module is in power down mode when JP26 is closed. Default setting: Not Fitted
JP4	Description of JP4 is in chapter 1.9 Motor control.

1.18 PSRAM and OneNAND

The 4Mbit PSRAM and 512Mbit OneNAND are connected to FSMC bus of STM32F207IFT6 which shares same IO's with CAN1 bus. The JP14 and JP15 must be kept on open for PSRAM, OneNAND and LCD application.

1.19 Development and Debug support

The two debug connectors available on STM3220F-EVAL evaluation board are:

1. CN14, standard 20-pins JTAG interface connector that is compliant with debug tools of ARM7 and ARM9.
2. CN13, SAMTEC 20-pins connector FTSH-110-01-L-DV for both SWD and Trace that is compliant with ARM CoreSight debug tools.

1.20 Display and Input devices

The 3.2" TFT color LCD connected to FSMC bus and 4 general purpose color LED's (LD 1,2,3,4) are available as display device. A touch screen connected to IO expander (U24), 4-direction joystick with selection key, general purpose button (B4), Wakeup button (B2) and Tamper detection button (B3) are available as input devices.

Table 16 LCD modules

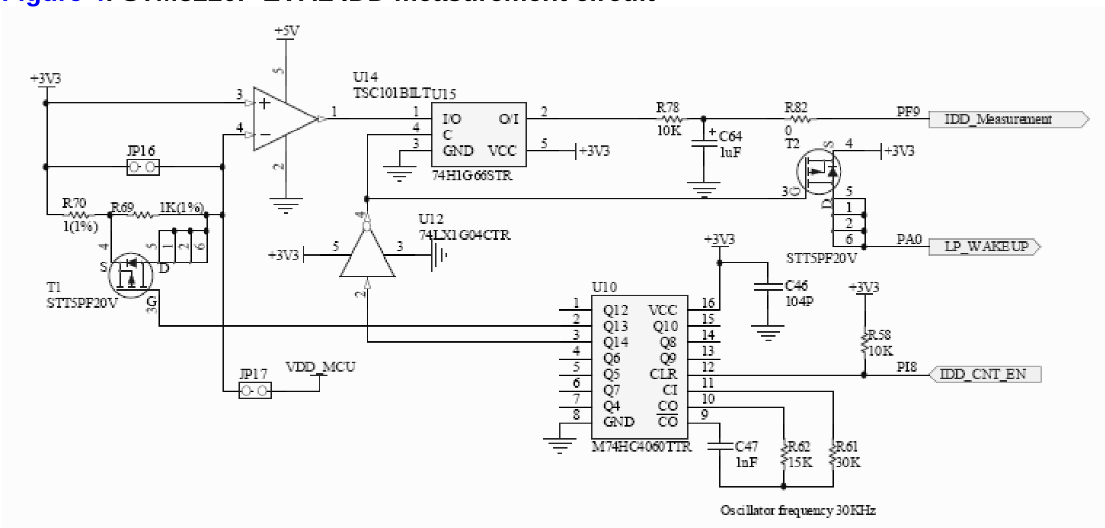
		3.2" TFT LCD with touch screen (CN16)			
Pin on CN16	Pin name	Pin connection	Pin on CN16	Pin name	Pin connection
1	CS	FSMC_NE3 (PG10)	18	PD14	FSMC_D12
2	RS	FSMC_A0	19	PD14	FSMC_D13
3	WR/SCL	FSMC_NWE	20	PD16	FSMC_D14
4	RD	FSMC_NOE	21	PD17	FSMC_D15
5	RESET	RESET#	22	BL_GND	GND
6	PD1	FSMC_D0	23	BL_Control	+5V
7	PD2	FSMC_D1	24	VDD	+3V3
8	PD3	FSMC_D2	25	VCI	+3V3

9	PD4	FSMC_D3	26	GND	GND
10	PD5	FSMC_D4	27	GND	GND
11	PD6	FSMC_D5	28	BL_VDD	+5V
12	PD7	FSMC_D6	29	SDO	NC
13	PD8	FSMC_D7	30	SDI	NC
14	PD10	FSMC_D8	31	XL	IO expander U24
15	PD11	FSMC_D9	32	XR	IO expander U24
16	PD12	FSMC_D10	33	YD	IO expander U24
17	PD13	FSMC_D11	34	YU	IO expander U24

1.21 IDD measurement and comparator

For IDD measurement the circuit below is implemented on STM3220F-EVAL.

Figure 4: STM3220F-EVAL IDD measurement circuit



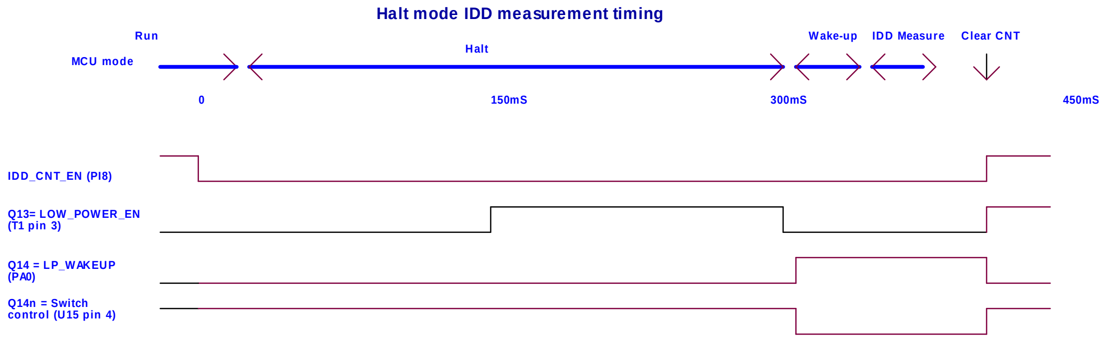
In Run mode, IDD current is measured thanks to TSC101BILT (U14) connected to the 1ohm shunt resistor. In this case IDD_CNT_EN remains at high level during measurement and JP16 jumper must be removed.

In Halt mode, the operational amplifier TSC101BILT (U14) is connected on the 1Kohm shunt resistor. To measure a current corresponding to the Halt mode the procedure is:

1. Configure ADC to measure voltage on IDD_measurement pin.
2. Configure PA0 as interrupt input on falling edge
3. Enter in Halt or active Halt mode with IDD_CNT_EN Low
4. LP_WAKEUP falling edge wakeup the MCU after 100ms
5. start ADC conversion as soon as possible after wakeup in order to measure the voltage corresponding to Sleep mode on 1uF capacitor
6. Reset the counter by programming IDD_CNT_EN High in less than 50mS after the wakeup to avoid 1Kohm to be connected later on VDD_MCU

In Halt mode, the 1K resistor is connected when T1 become off after entering in Halt mode. Q13 output of the counter allows connecting the 1K when the current IDD becomes very low. The measurement timing is given below:

Figure 5: STM3220F-EVAL IDD Halt mode measurement timing diagram



The halt mode measurement procedure can be used in Halt mode and slow or fast active Halt modes if the IDD current do not exceed 60uA else the Run measurement procedure need to be used up to 60mA.

2. Connector

2.1 Daughter board extension connector CN1,2,3 and CN4

Four male headers CN1,2,3 and CN4 can be used to connect with daughter board or standard wrapping board to STM3220F-EVAL evaluation board. All total 140 GPI/Os are available on it.

Each pin on CN1,2,3 and CN4 can be used by a daughter board after disconnecting it from the corresponding function block on STM3220F-EVAL evaluation board. Please refer to table 17 to table 20 for detail.

Table 17 Daughter board extension connector CN1

Pin	Description	Alternative Function	How to disconnect with function block on STM3220F-EVAL board
1	GND	-	-
3	PE3	Trace_D0	-
5	PE5	Trace_D2	
7	PI8	IDD_CNT_EN	-
9	PC14	OSC32_IN	SB4 open
11	PC15	OSC32_OUT	SB5 open
13	PI10	MII_RX_ER	Remove RS3
15	PF0	FSMC_A0	-
17	PF2	FSMC_A2	-
19	GND	-	-
21	PF5	FSMC_A5	-
23	PF7	SmartCard_RST &MC	JP3 open
25	PF9	IDD_Measurement & MC	Remove R82 Disconnect Motor Control board from CN5
27	PH0	OSC_IN	SB6 open
29	PC0	ULPI_STP	-
31	PC1	MII_MDC	-
33	PC3	MII_TX_CLK	Remove RS5
35	PA0	WakeUP	Remove R139
37	PA2	MII_MDIO	-
39	GND	-	-
41	PH4	ULPI_NXT	Can not be used on daughter board
43	NC	-	-
45	NC	-	-
47	EMU_3V3	-	-
49	EMU_5V	-	-
2	PE2	Trace_CLK	-
4	PE4	Trace_D1	-
6	PE6	Trace_D3	-
8	PC13	Anti-Tamper	Remove R143
10	GND	-	-
12	PI9	LED3	Remove R141
14	PI11	ULPI_DIR	Can not be used on daughter board
16	PF1	FSMC_A1	-
18	PF3	FSMC_A3	-
20	PF4	FSMC_A4	-
22	PF6	SmartCard_OFF & MC	JP20 open
24	PF8	MC	Disconnect Motor Control board from CN5
26	PF10	MC	Disconnect Motor Control board from CN5
28	PH1	OSC_OUT	SB7 open

30	GND	-	-
32	PC2	MII_TXD2 & potentiometer	JP23 open
34	VREF+	-	-
36	PA1	MII_RX_CLK	JP6 open
38	PH2	MII_CRS	Remove RS3
40	PH3	MII_COL	Remove RS3
42	PH5	OTG_FS_PowerSwitchOn	Remove R18
44	NC	-	-
46	NC	-	-
48	APP_3V3	-	-
50	GND	-	-

Table 18 Daughter board extension connector CN2

Pin	Description	Alternative Function	How to disconnect with function block on STM3220F-EVAL board
1	GND	-	-
3	PA3	ULPI_D0	-
5	PA5	ULPI_CLK	Can not be used on daughter board
7	PA7	MII_RX_DV	Remove RS2, JP8 open
9	PC5	MII_RXD1	Remove RS2
11	PB0	ULPI_D1	-
13	PB2	BOOT1	-
15	PF12	FSMC_A6	-
17	PF14	FSMC_A8	-
19	GND	-	-
21	PG1	FSMC_A11	-
23	PE8	FSMC_D5	-
25	PE10	FSMC_D7	-
27	PE12	FSMC_D9	-
29	PE14	FSMC_D11	-
31	PE15	FSMC_D12	-
33	PB11	ULPI_D4	-
35	PH7	MII_RXD3	Remove RS3
37	PH9	DCMI_D0	Remove camera module from CN15
39	GND	-	-
2	APP_VCC	-	-
4	PA4	Audio_DAC_OUT	Remove R115
6	PA6	DCMI_PIXCK	Remove camera module from CN15
8	PC4	MII_RXD0	Remove RS2
10	GND	-	-
12	PB1	ULPI_D2	-
14	PF11	OTG_FS_Overcurrent	Remove R15
16	PF13	FSMC_A7	-
18	PF15	FSMC_A9	-
20	PG0	FSMC_A10	-
22	PE7	FSMC_D4	-
24	PE9	FSMC_D6	-
26	PE11	FSMC_D8	-
28	PE13	FSMC_D10	-
30	GND	-	-
32	PB10	ULPI_D3	-
34	PH6	MII_RXD2	Remove RS5
36	PH8	DCMI_HSYNC & MC	Remove camera module from CN15 Disconnect Motor Control board from CN5
38	PH10	DCMI_D1 &MC	Remove camera module from CN15

			Disconnect Motor Control board from CN5
40	PH11	DCMI_D2 &MC	Remove camera module from CN15 Disconnect Motor Control board from CN5

Table 19 Daughter board extension connector CN3

Pin	**Description**	**Alternative Function**	**How to disconnect with function block on STM3220F-EVAL board**
1	GND	-	-
3	PI1	I2S_CK	-
5	PH15	SmartCard_3/5V & MC	Disconnect Motor Control board from CN5
7	PH13	MicroSDCard_defect & MC	Remove MicroSD card from CN6 Disconnect Motor Control board from CN5
9	PC13	Anti-Tamper	Remove R143
11	RESET#	Reset button	-
13	PA11	OTG_FS_DM	Remove R17
15	PA9	VBUS_FS	Remove USB cable from CN8 Remove R18
17	PC9	MicroSDCard_D1 & MC	Remove MicroSD card from CN6 Disconnect Motor Control board from CN5
19	EMU_5V	-	-
21	PC6	I2S_MCK & SmartCard_IO	JP21 open
23	PG7	SmartCard_CLK	-
25	PG5	FSMC_A15	-
27	PG3	FSMC_A13	-
29	PD15	FSMC_D1	-
31	PD14	FSMC_D0	-
33	PD12	FSMC_A17	-
35	PD10	FSMC_D15	-
37	PD8	FSMC_D13	-
39	GND	-	-
41	PB13	ULPI_D6 & CAN2_TX	-
43	PH12	DCMI_D3 & MC	Remove camera module from CN15 Disconnect Motor Control board from CN5
45	NC	-	-
47	EMU_3V3	-	-
49	EMU_5V	-	-
2	PI2	IO_Expandor_INT	Remove R136
4	PI0	I2S_CMD	-
6	PH14	DCMI_D4 & MC	Remove camera module from CN15 Disconnect Motor Control board from CN5
8	PA13	TMS/SWDIO	-
10	GND	-	-
12	PA12	OTG_FS_DP	Remove R19
14	PA10	OTG_FS_ID	Remove R21
16	PA8	MCO	JP5 open
18	PC8	MicroSDCard_D0 & MC	Remove MicroSD card from CN6 Disconnect Motor Control board from CN5
20	PC7	LED4	Remove R140
22	PG8	LED2	Remove R154
24	PG6	LED1	Remove R155
26	PG4	FSMC_A14	-
28	PG2	FSMC_A12	-
30	GND	-	-

32	PD13	MC	Disconnect Motor Control board from CN5
34	PD11	FSMC_A16	-
36	PD9	FSMC_D14	-
38	PB15	OneNAND_INT	Remove R53
40	PB14	MII_INT	Remove R41
42	PB12	ULPI_D5	-
44	NC	-	-
46	NC	-	-
48	APP_3V3	-	-
50	GND	-	-

Table 20 Daughter board extension connector CN4

Pin	Description	Alternative Function	How to disconnect with function block on STM3220F-EVAL board
1	GND	-	-
3	PI6	DCMI_D6 & MC	Remove camera module from CN15 Disconnect Motor Control board from CN5
5	PI4	DCMI_D5 & MC	Remove camera module from CN15 JP4 open
7	PE0	FSMC_BL0	-
9	PB8	MII_TXD3 & MC	Remove RS5 Disconnect Motor Control board from CN5
11	BOOT0	BOOT0	-
13	PB6	I2C1_SCK	Remove R103
15	PB4	TRST	-
17	PG15	User button	Remove R150
19	GND	-	-
21	PG12	SmartCard_CMDVCC	Remove R128
23	PG10	FSMC_NE3	Remove LCD board MB785 from CN19
25	PD7	FSMC_NE1	Remove R52
27	PD5	FSMC_NWE	-
29	PD3	FSMC_CLK	-
31	PD2	MicroSDCard_CMD	-
33	PD0	FSMC_D2 & CAN1_RX	JP15 open
35	PC11	MicroSDCard_D3 & RS232/IrDA_RX	JP22 open Remove MicroSD card from CN6
37	PA15	TDI	-
39	GND	-	-
2	PI7	DCMI_D7 & MC	Remove camera module from CN15 Disconnect Motor Control board from CN5
4	PI5	DCMI_VSYNC & MC	Remove camera module from CN15 Disconnect Motor Control board from CN5
6	PE1	FSMC_BL1	-
8	PB9	I2C1_SDA	Remove R111
10	GND	-	-
12	PB7	FSMC_NL	-
14	PB5	ULPI_D7 & CAN2_RX	JP11 open
16	PB3	TDO/SWO	-
18	PG14	MII_TXD1	Remove RS6
20	PG13	MII_TXD0	Remove RS6
22	PG11	MII_TX_EN	Remove RS6
24	PG9	FSMC_NE2	Remove R47
26	PD6	FSMC_NWAIT	Remove R54

28	PG4	FSMC_A14	-
30	GND	-	-
32	PD1	FSMC_D3 & CAN1_TX	JP14 open
34	PC12	MicroSDCard_ CLK	Remove MicroSD card from CN6
36	PC10	MicroSDCard_ D2 & RS232/IrDA_T X	Remove MicroSD card from CN6
38	PA14	TCK/SWCLK	-
40	PI3	I2S_DIN	-

Note: The 0ohm resister will added on PCB rev.B for PI11(ULPI_DIR), PA5(ULPI_CLK) & PH4(ULPI_NXT) usage on daughter board. For ULPI[0..7], it's in input status for PHY USB3300 by default, so, 0ohm resister is not needed, TBC.

2.2 Motor control connector CN5

Figure 6 Motor Control connector CN5

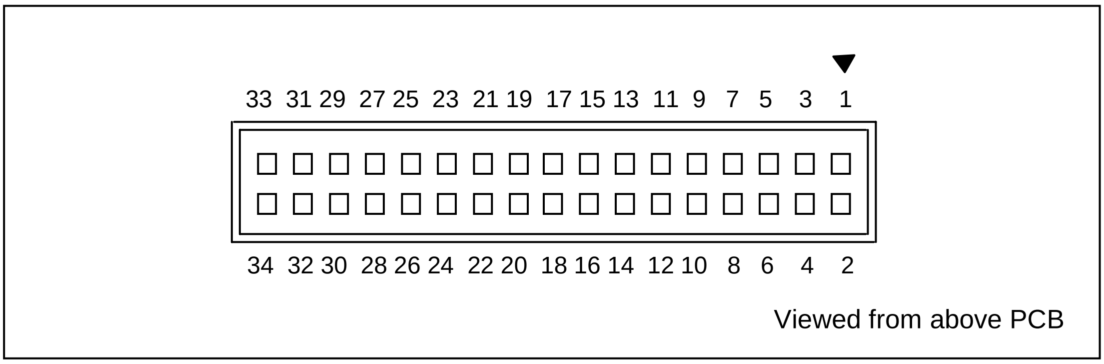


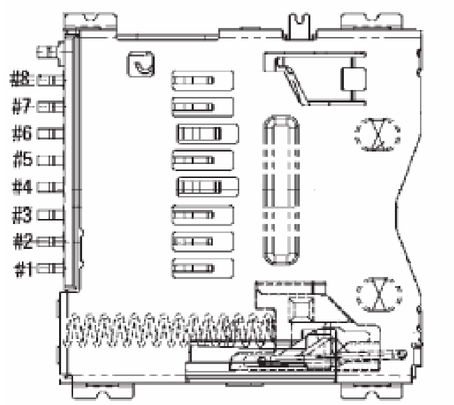
Table 21 Motor Control connector CN5

Description	**Pin of STM32F207IFT6**	**Pin number of CN17**	**Pin number of CN17**	**Pin of STM32F207IFT6**	**Description**
EMERGENCY STOP	PI4	1	2		GND
PWM-UH	PI5	3	4		GND
PWM-UL	PH	5	6		GND
PWM-VH	PI6	7	8		GND
PWM-VL	PH14	9	10		GND
PWM-WH	PI7	11	12		GND
PWM-WL	PH15	13	14	PF6	BUS VOLTAGE
PHASE A CURRENT	PF8	15	16		GND
PHASE B CURRENT	PF9	17	18		GND
PHASE C CURRENT	PF10	19	20		GND
NTC BYPASS RELAY	PH8	21	22		GND
DISSIPATIVE BRAKE PWM	PC8	23	24		GND
+5V power	+5V	25	26	PF7	Heatsink

					temperature
PFC SYNC	PH10 and PH11	27	28		VDD_Micro
PFC PWM	PH12	29	30		GND
Encoder A	PB8	31	32		GND
Encoder B	PD13	33	34	PC9	Encoder Index

2.3 MicroSD connector CN6

Figure 7 MicroSD connector CN6



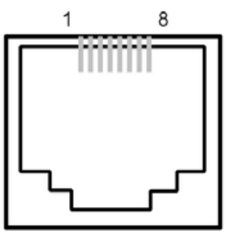
Viewed from front

Table 22 MicroSD connector CN6

Pin number	Description	Pin number	Description
1	SDIO_D2 (PC11)	5	SDIO_CLK (PC12)
2	SDIO_D2 (PC10)	6	Vss/GND
3	SDIO_CMD (PD2)	7	SDIO_D0 (PC9)
4	+3V3	8	SDIO_D1 (PC8)
		9	MicroSDcard_detect (PH13)

2.4 Ethernet RJ45 connector CN7

Figure 8 Ethernet RJ45 connector CN7



Viewed from front

Table 23 RJ45 connector CN7

Pin number	Description	Pin number	Description
1	TxData+	2	TxData-
3	RxData+	4	Shield
5	Shield	6	RxData-
7	Shield	8	Shield

2.5 USB OTG FS Micro-AB connector CN8

Figure 9 USB OTG FS Micro-AB connector CN8



Viewed from front

Table 24 USB OTG FS Micro-AB connector CN8

Pin number	Description	Pin number	Description
1	VBUS (PA9)	4	ID (PA10)
2	D- (PA11)	5	GND
3	D+ (PA12)		

2.6 USB OTG HS Micro-AB connector CN9

Figure 10 USB OTG HS Micro-AB connector CN9



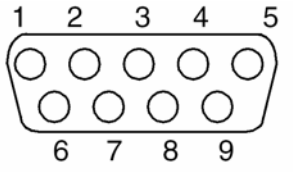
Viewed from front

Table 25 USB OTG HS Micro-AB connector CN9

Pin number	Description	Pin number	Description
1	VBUS	4	ID
2	D-	5	GND
3	D+		

2.7 CAN D-type 9-pins male connector CN10(CAN2) & CN12(CAN1)

Figure 11 CAN D-type 9-pins male connector CN10 (CAN2) & CN12 (CAN1)



Viewed from front

Table 26 CAN D-type 9-pins male connector CN10 (CAN2) & CN12 (CAN1)

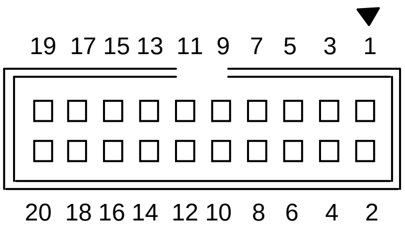
Pin number	Description	Pin number	Description
1,4,8,9	NC	7	CANH
2	CANL	3,5,6	GND

2.8 Audio connector CN11

A 3.5mm Stereo audio jack CN11 with plug-detection feature connected to audio DAC is available on STM3220F-EVAL board.

2.9 Trace debugging connector CN13

Figure 12 Trace debugging connector CN13



Viewed from above PCB

Table 27 Trace debugging connector CN13

Pin number	Description	Pin number	Description
1	3.3V power	2	TMS/PA13
3	GND	4	TCK/PA14
5	GND	6	TDO/PB3
7	KEY	8	TDI/PA15
9	GND	10	RESET#
11	GND	12	TraceCLK/PE2
13	GND	14	TraceD0/PE3 or SWO/PB3
15	GND	16	TraceD1/PE4 or nTRST/PB4
17	GND	18	TraceD2/PE5
19	GND	20	TraceD3/PE6

2.10 JTAG debugging connector CN14

Figure 13 JTAG debugging connector CN14

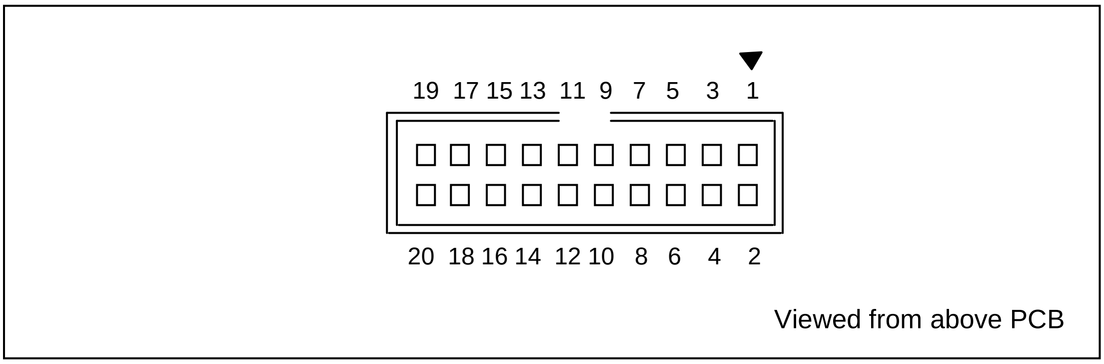


Table 28 JTAG debugging connector CN14

Pin number	Description	Pin number	Description
1	3.3V power	2	3.3V power
3	PB4	4	GND
5	PA15	6	GND
7	PA13	8	GND
9	PA14	10	GND
11	RTCK	12	GND
13	PB3	14	GND
15	RESET#	16	GND
17	DBGRQ	18	GND
19	DBGACK	20	GND

2.11 Camera module connector CN15

Figure 14 Camera module connector CN15

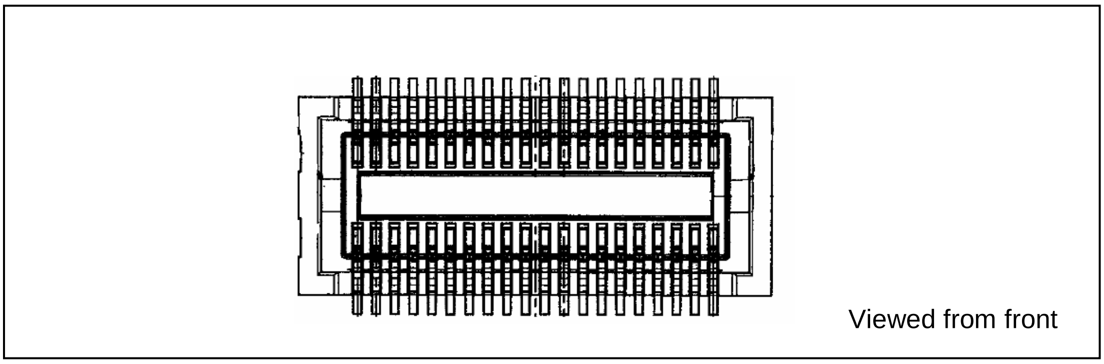


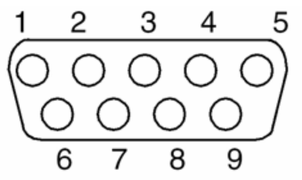
Table 29 Camera module connector CN15

Pin number	Description	Pin number	Description
1	DGND	13	XCLK1
2	DGND	14	Y6(PI6)
3	SIO_D (PB9)	15	DGND
4	AVDD (2.8V)	16	Y5(PI4)
5	SIO_C (PB6)	17	PCLK (PA6)
6	RESET	18	Y4(PH14)
7	VSYNC (PI5)	19	Y0 (PH9)
8	PWDN	20	Y3(PH12)
9	HREF (PH8)	21	Y1(PH10)
10	DVDD (1.8V)	22	Y2(PH11)

11	VOVDD (2.8V)	23	AGND
12	Y7(PI7)	24	AGND

2.12 RS232 connector CN16

Figure 15 RS232 connector CN16 with ISP support



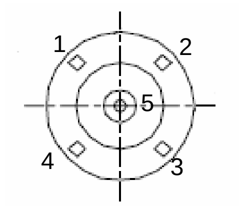
Viewed from front

Table 30 RS232 connector CN16 with ISP support

Pin number	Description	Pin number	Description
1	Bootloader_RESET	6	NC
2	RS232_RX (PC11)	7	NC
3	RS232_TX (PC10)	8	Bootloader_BOOT0
4	NC	9	NC
5	GND		

2.13 Analog input connector CN17

Figure 16 Analog input connector CN17



Viewed from bottom

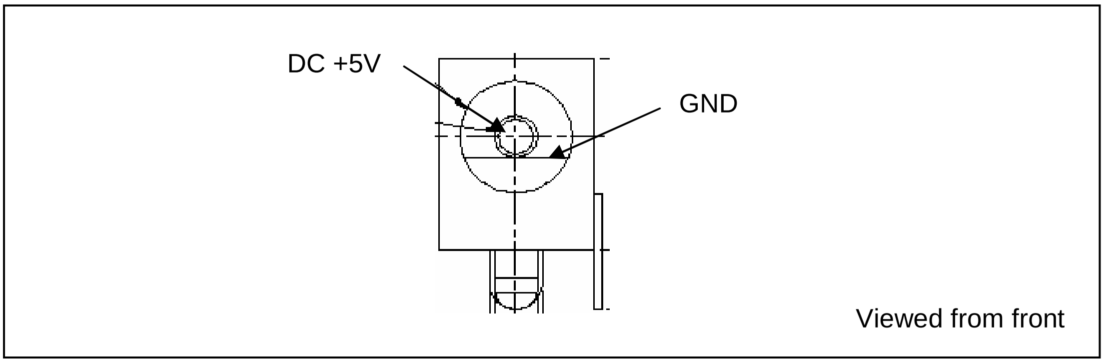
Table 31 Analog input connector CN17

Pin number	Description	Pin number	Description
1	GND	4	GND
2	GND	5	Analog input PF8
3	GND		

2.14 Power connector CN18

Your STM3220F-EVAL evaluation board can be powered from a DC 5V power supply via the external power supply jack (CN18) shown in Figure17. The central pin of CN18 must be positive.

Figure 17 Power supply connector CN18



2.15 TFT LCD connector CN19

One 34-pin male header CN19 is available on the board to connect LCD module board MB785. Please refer to chapter 1.20 for detail.

2.16 Smart card connector CN20

Figure 18 Smart card connector CN20

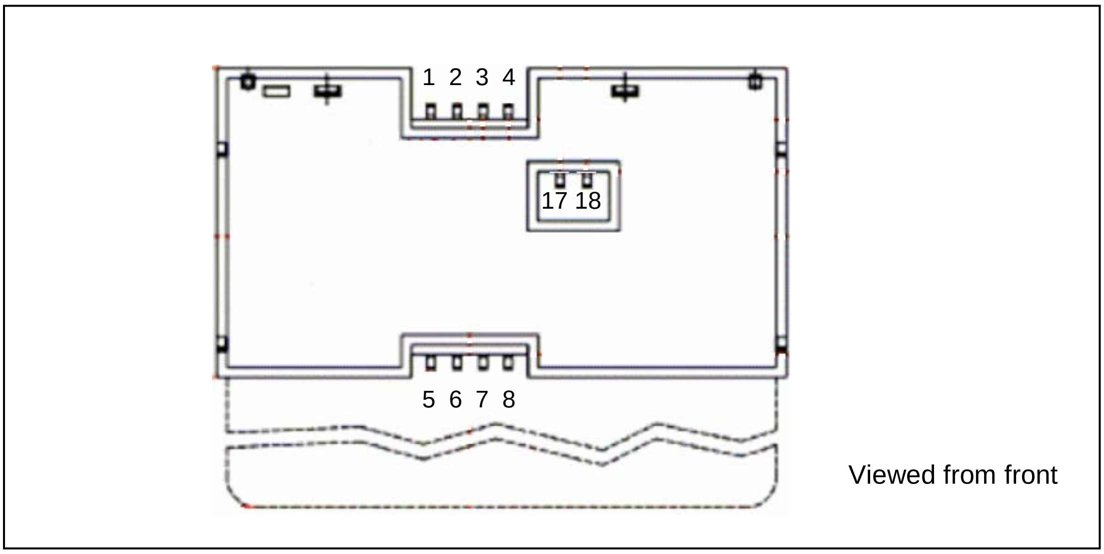


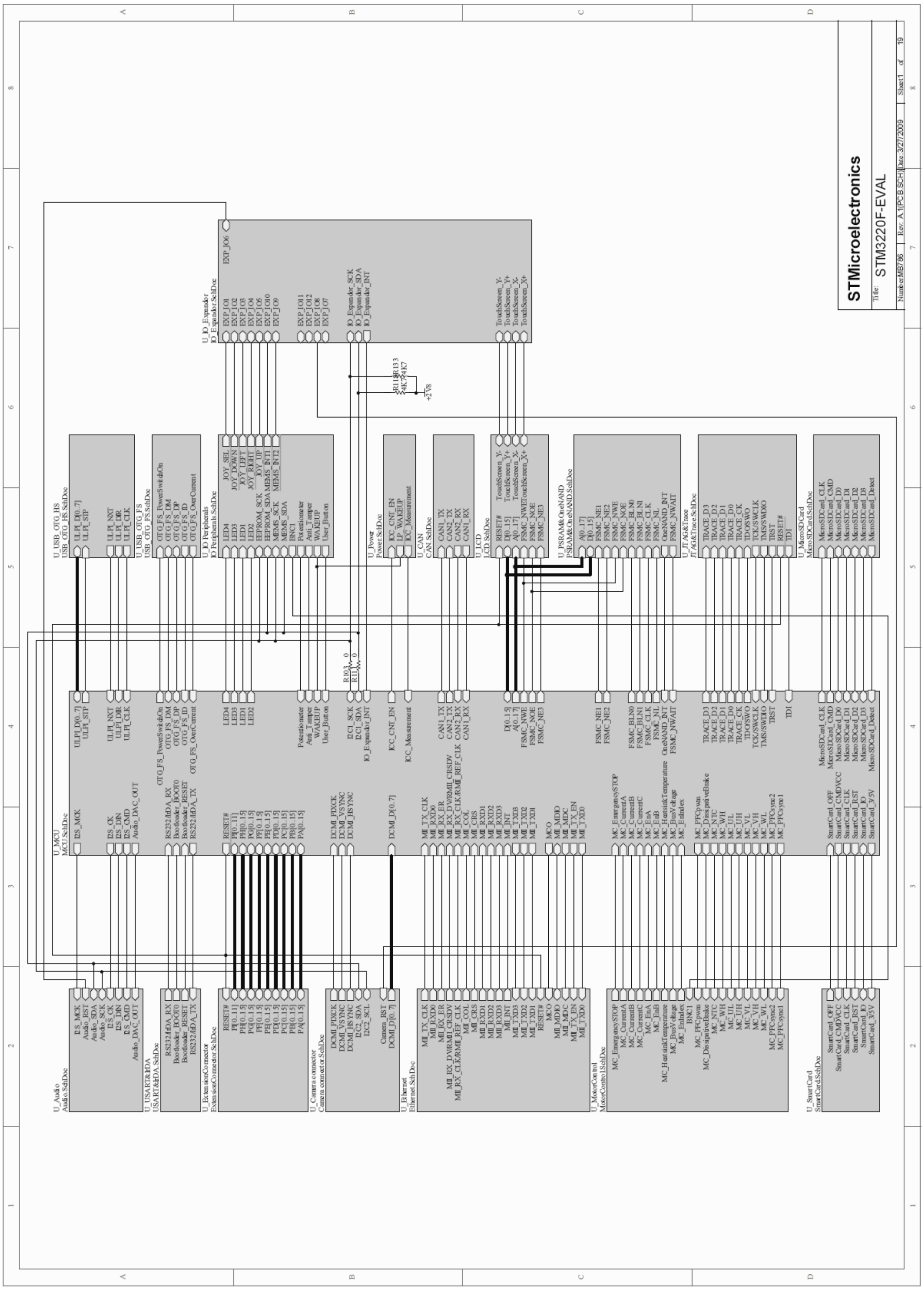
Table 32 Smart card connector CN20

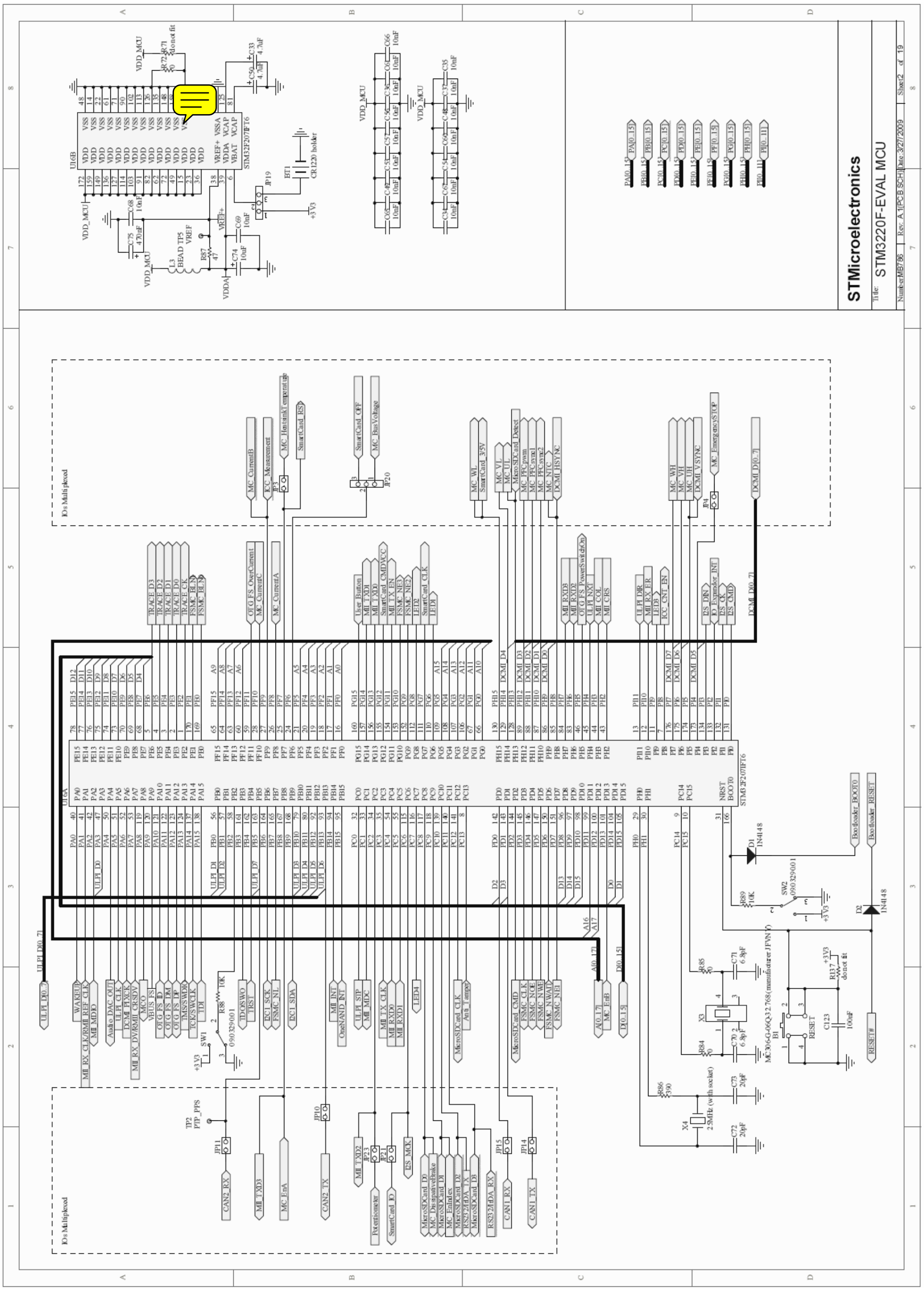
Pin number	Description	Pin number	Description
1	VCC	5	GND
2	RST	6	NC
3	CLK	7	I/O
4	NC	8	NC
17	Detection pin of card presence	18	Detection pin of card presence

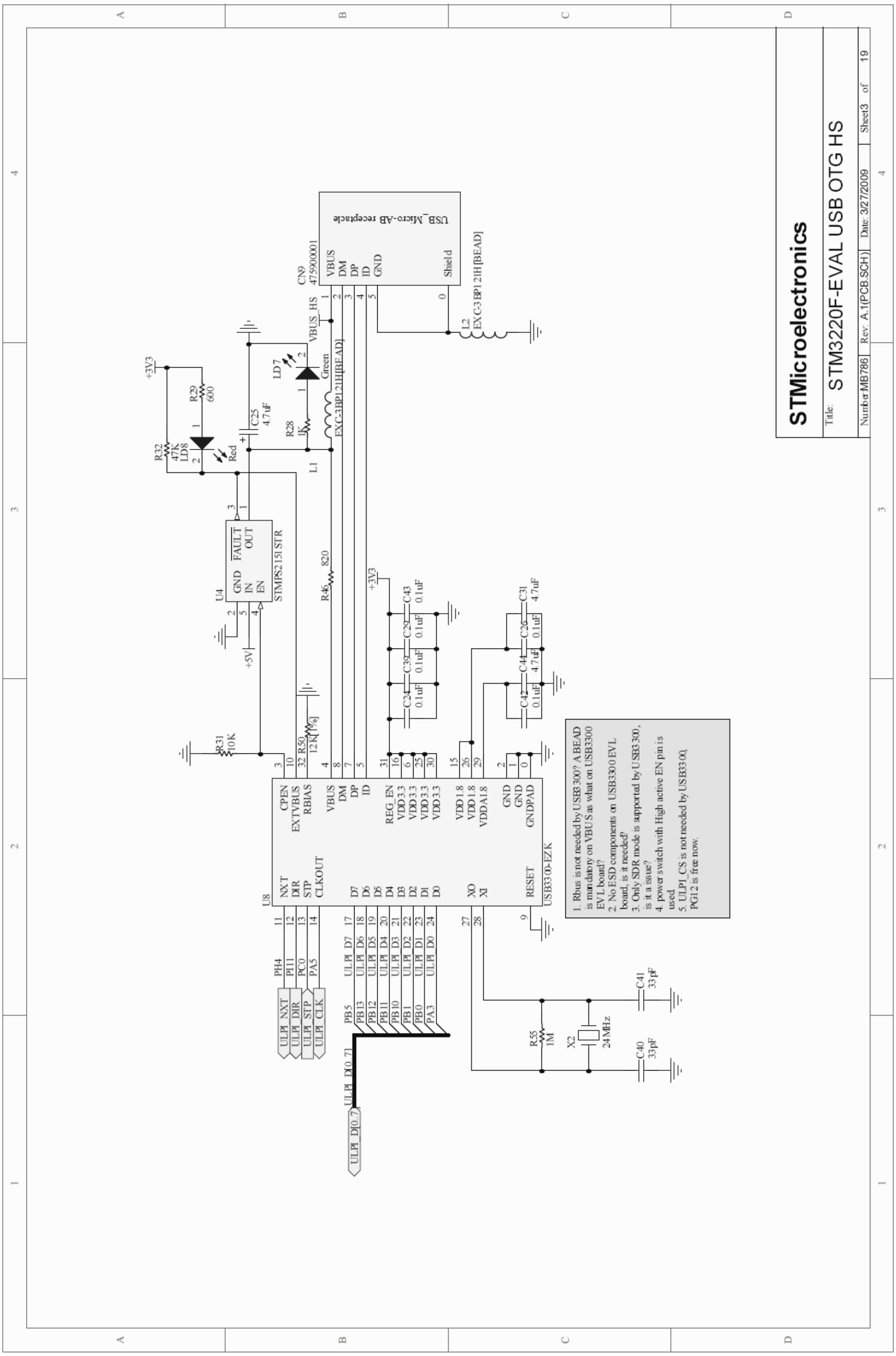
3. Known limitations and bugs on PCB rev A

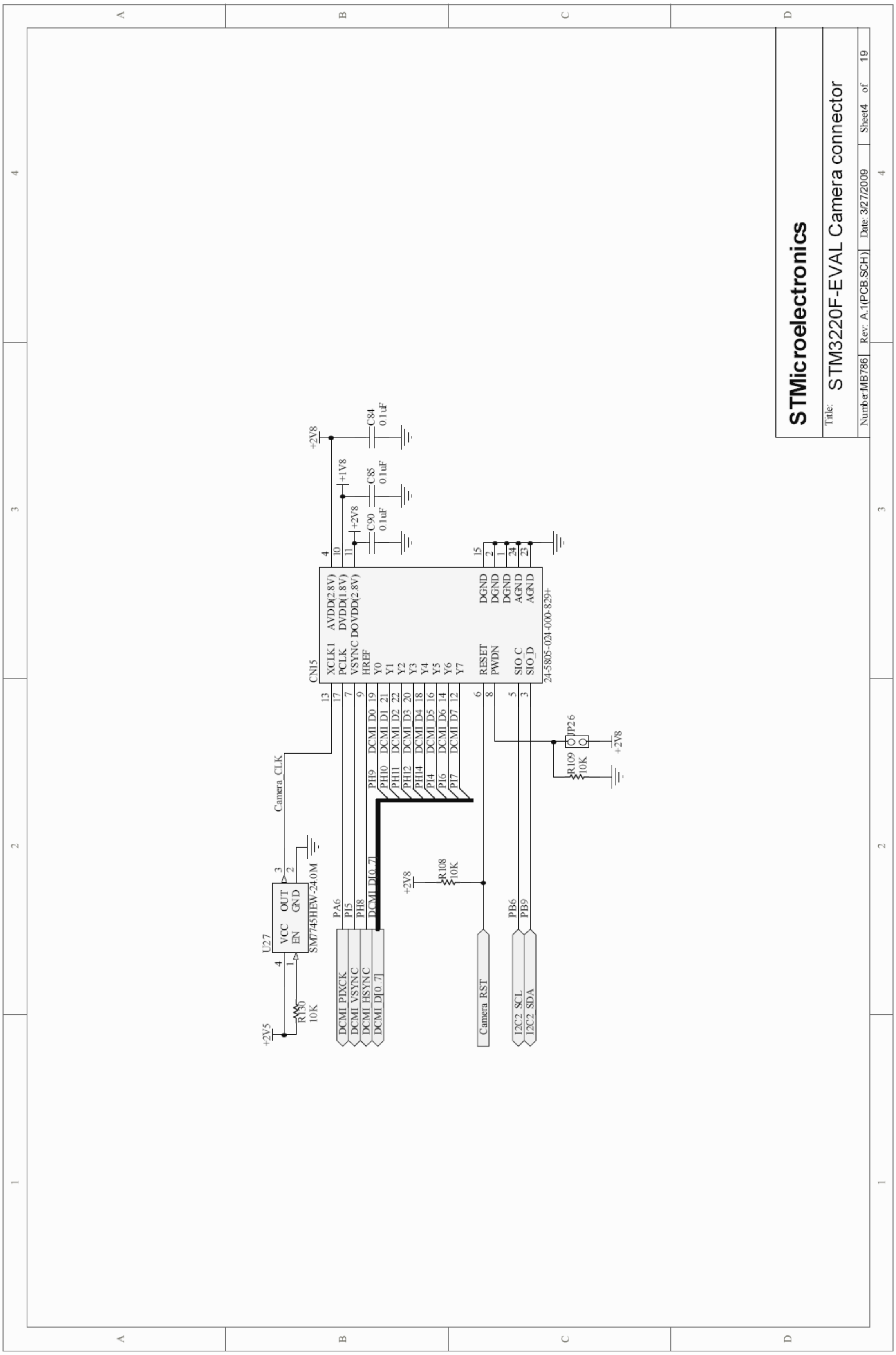
- When using MB760 adapter to connect the board to the STice some precautions need to be considered to avoid short-circuits between MB760 PCB and the daughter boards connectors CN2, CN3 and CN4 pins. An adhesive strip on bottom side of MB760 used as isolation may be damaged when the MB687 (flexPCB) is plugged on MB760 J2 connector. To avoid this issue it strongly recommended to connect first the MB687 to MB760 then to screw MB760 to MCU socket on evaluation board (MB786).
- On Mother board (MB786) Sheet 1 & 4 PB6 and PB9 are named respectively I2C2_SCL and I2C2_SDA. Actually PB6 and PB9 alternate function are on I2C1
- DCD signal on RS232 connector is connected to board RESET for bootloader applications. It is not possible to disconnect this signal from RESET directly on the board so when using RS232 interface the host need to maintain DCD signal low or the corresponding pin needs to be disconnected on RS232 cable or connector.
- BOOT0 and BOOT1 switches are swapped on the silkscreen.
- Joystick is rotated by 180° compared to signals names on the schematic. Therefore a workaround is needed in the software to swap up with down and right with left signals.

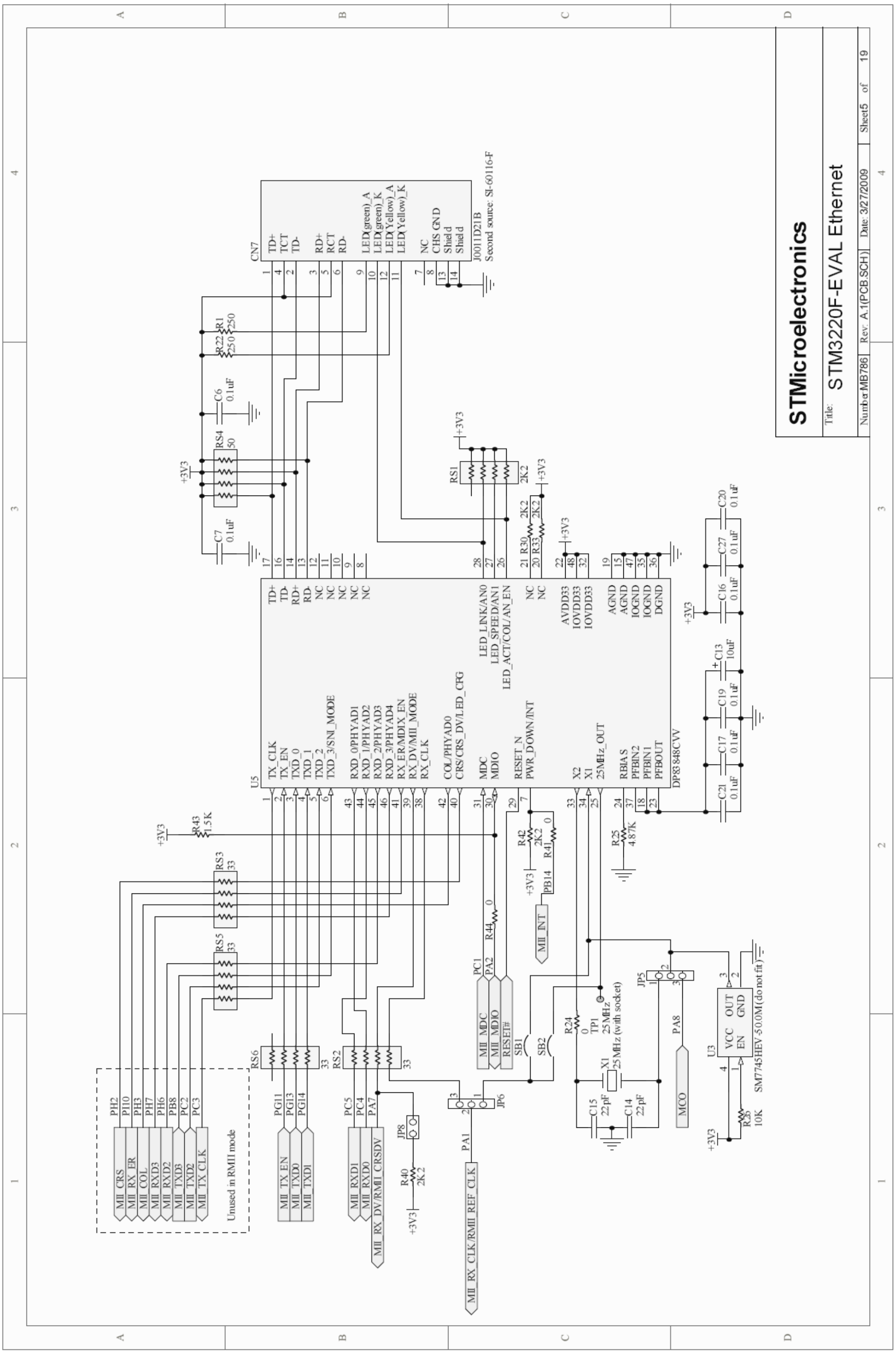
4. Schematic

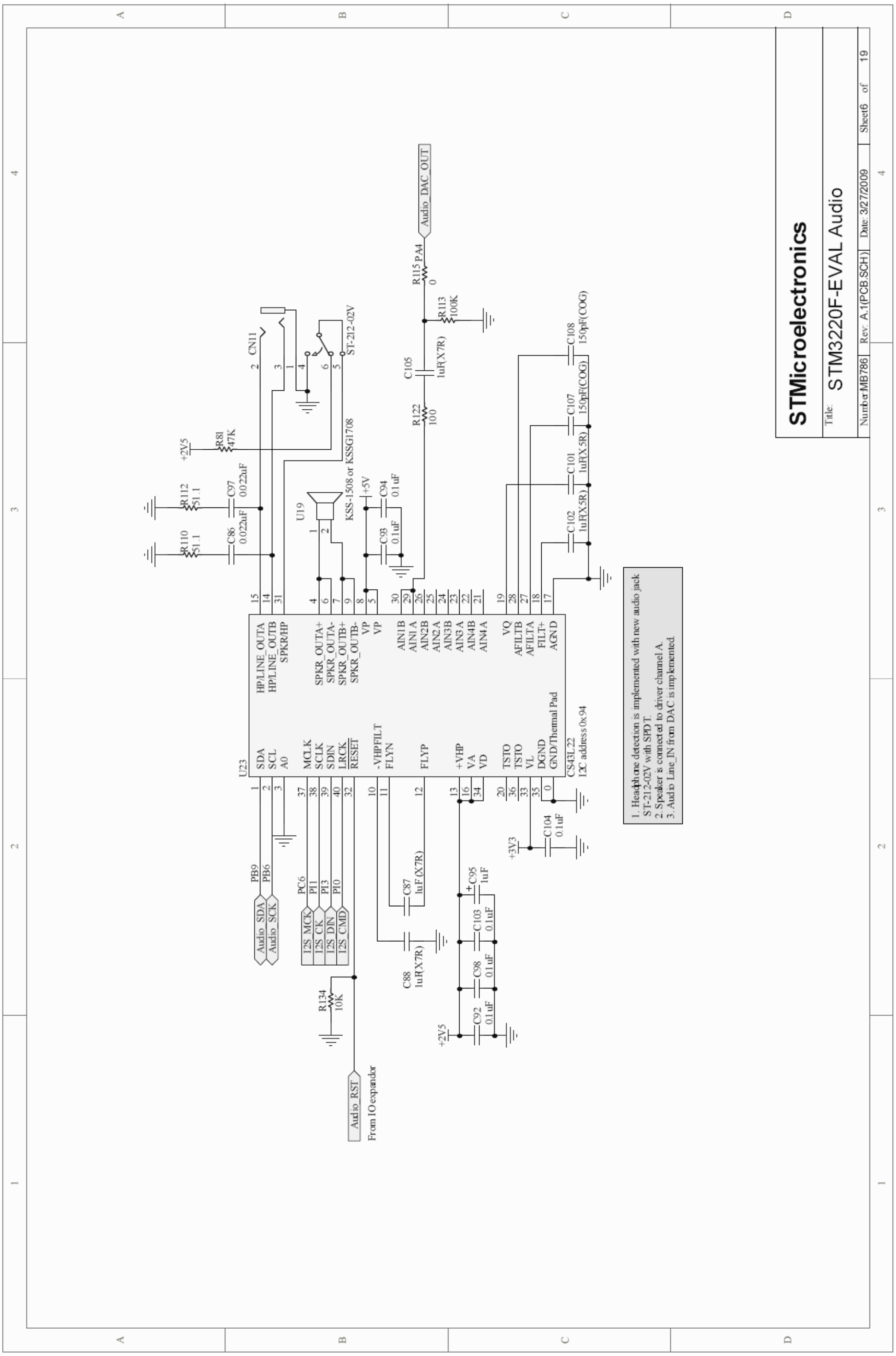


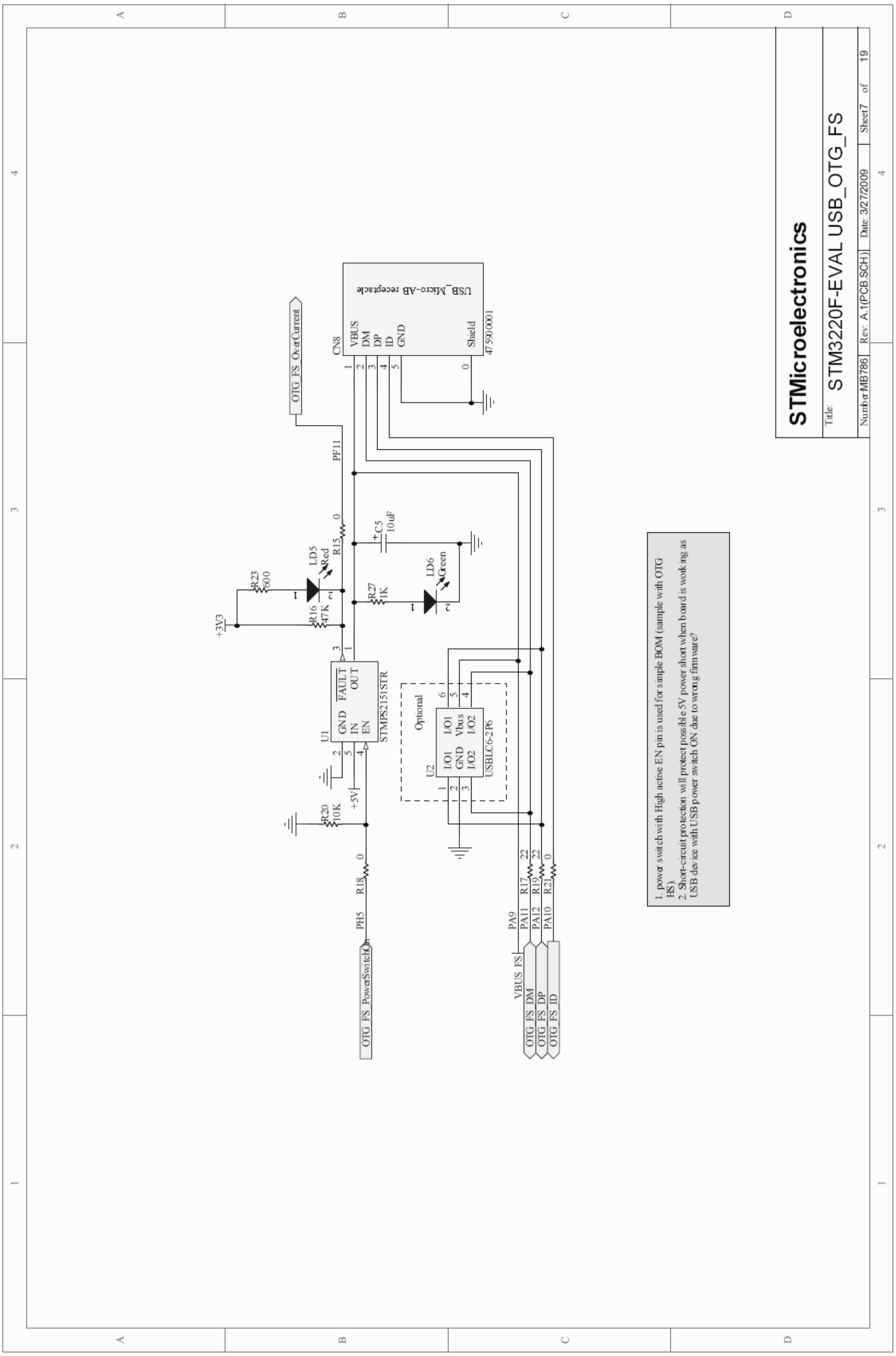

STMicroelectronics
STM3220F-EVAL MCU

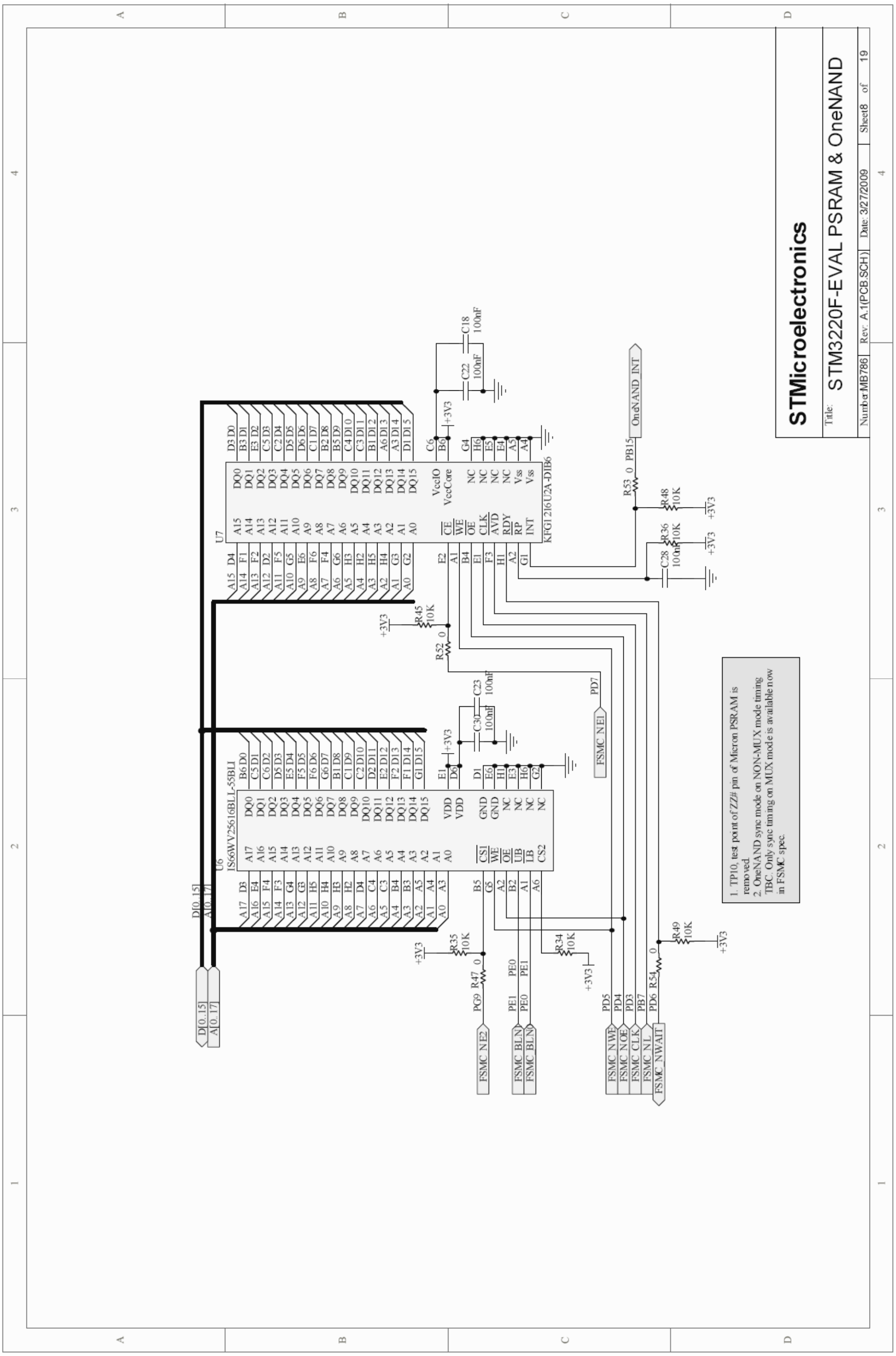

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Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet3 of 19

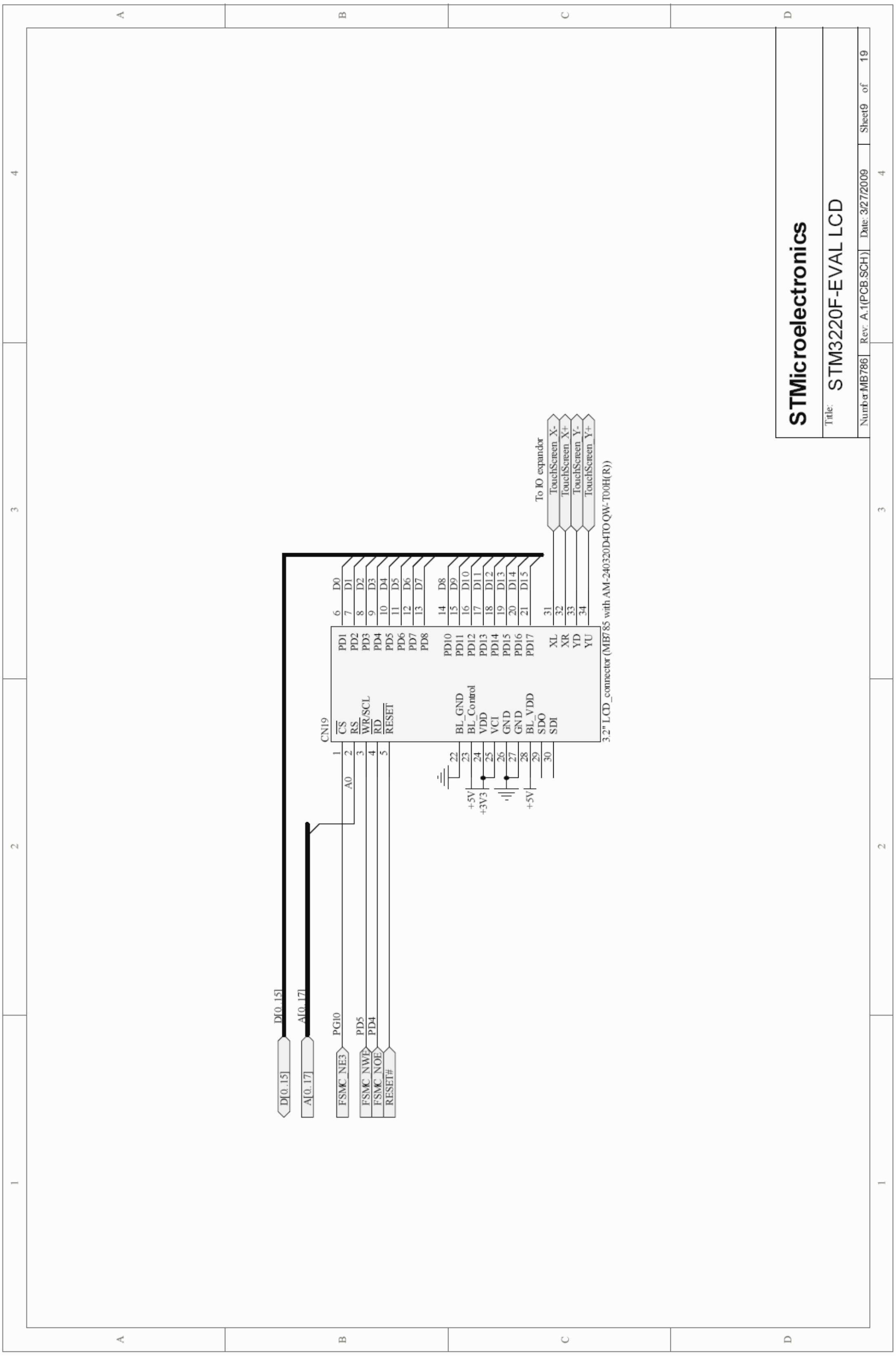

STMicroelectronics
Title: STM3220F-EVAL Camera connector
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet4 of 19

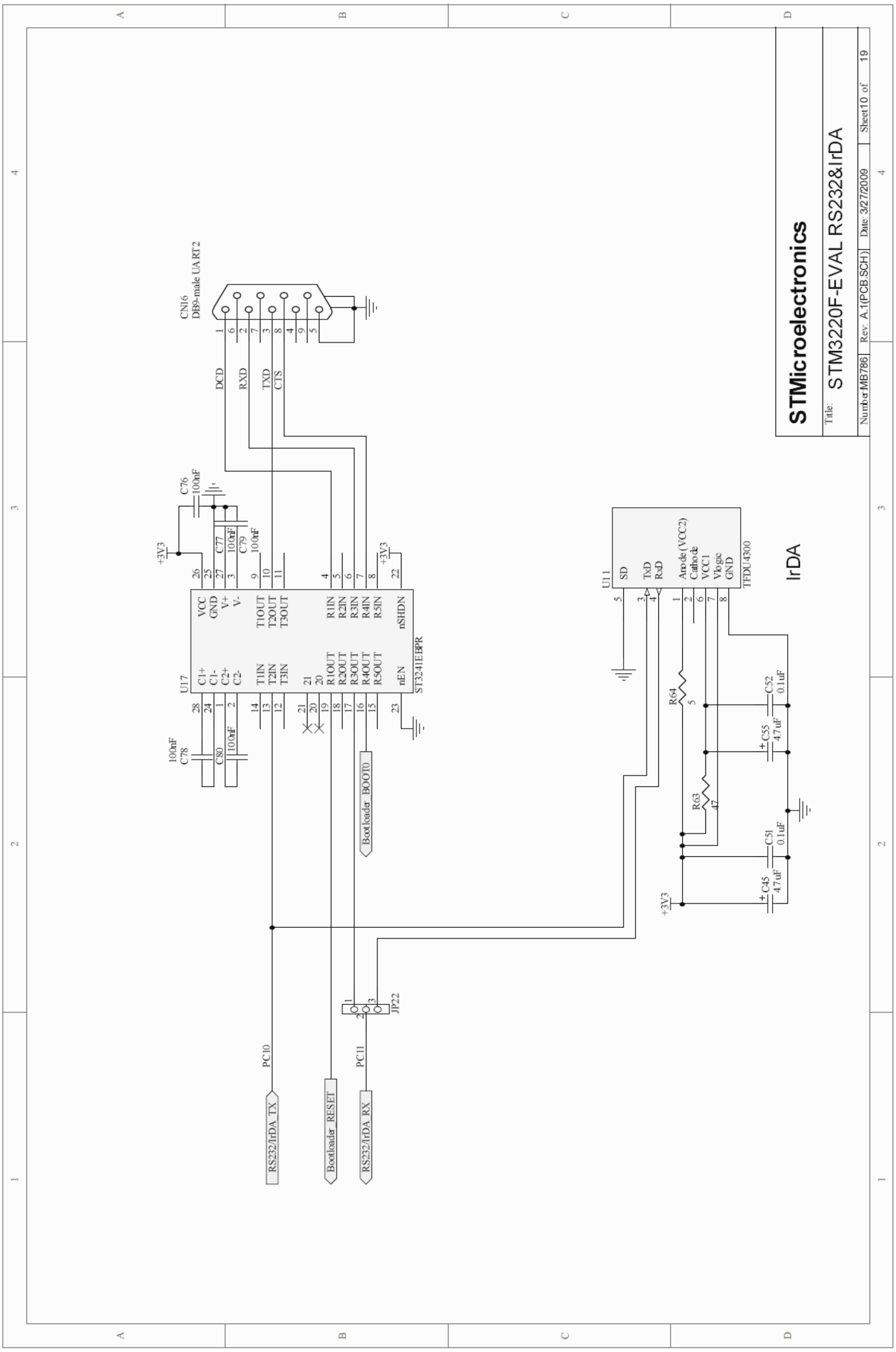

STMicroelectronics
Title: STM3220F-EVAL Ethernet
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet 5 of 19
DP83848CVV
SM7745HEV-50.0M(do not fit)
Unused in RMII mode

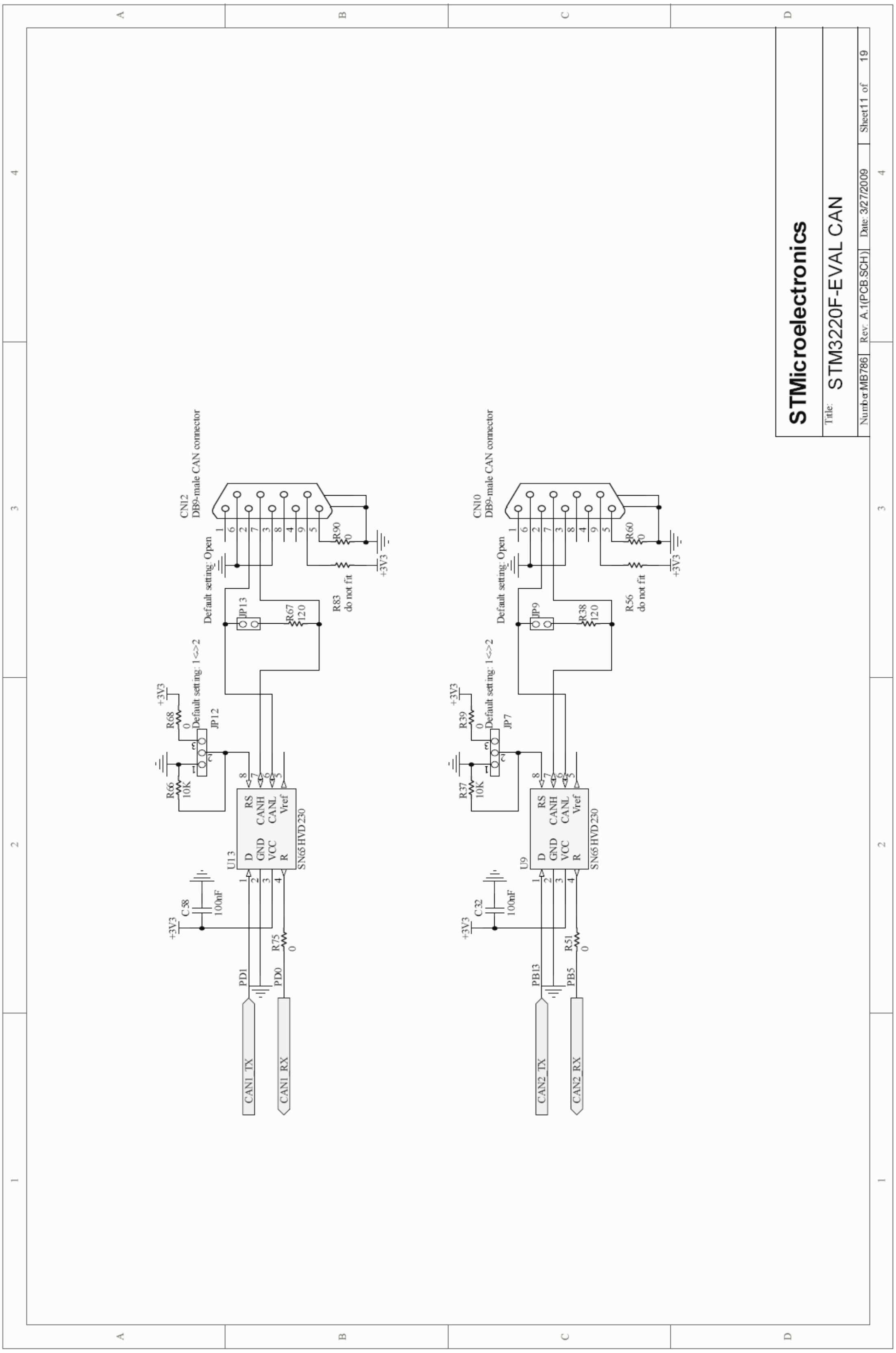

STMicroelectronics
Title: STM3220F-EVAL Audio
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet6 of 19
U23
CS43L22
I2C address 0x94
Audio_DAC_OUT
Audio_SDA
Audio_SCK
I2S_MCK
I2S_CK
I2S_DIN
I2S_CMD
Audio_RST
From IO expandor
CN11
ST-212-02V
U19
KSS-1508 or KSSG1708
1. Headphone detection is implemented with new audio jack ST-212-02V with SPDT.
2. Speaker is connected to driver channel A.
3. Audio Line_IN from DAC is implemented.

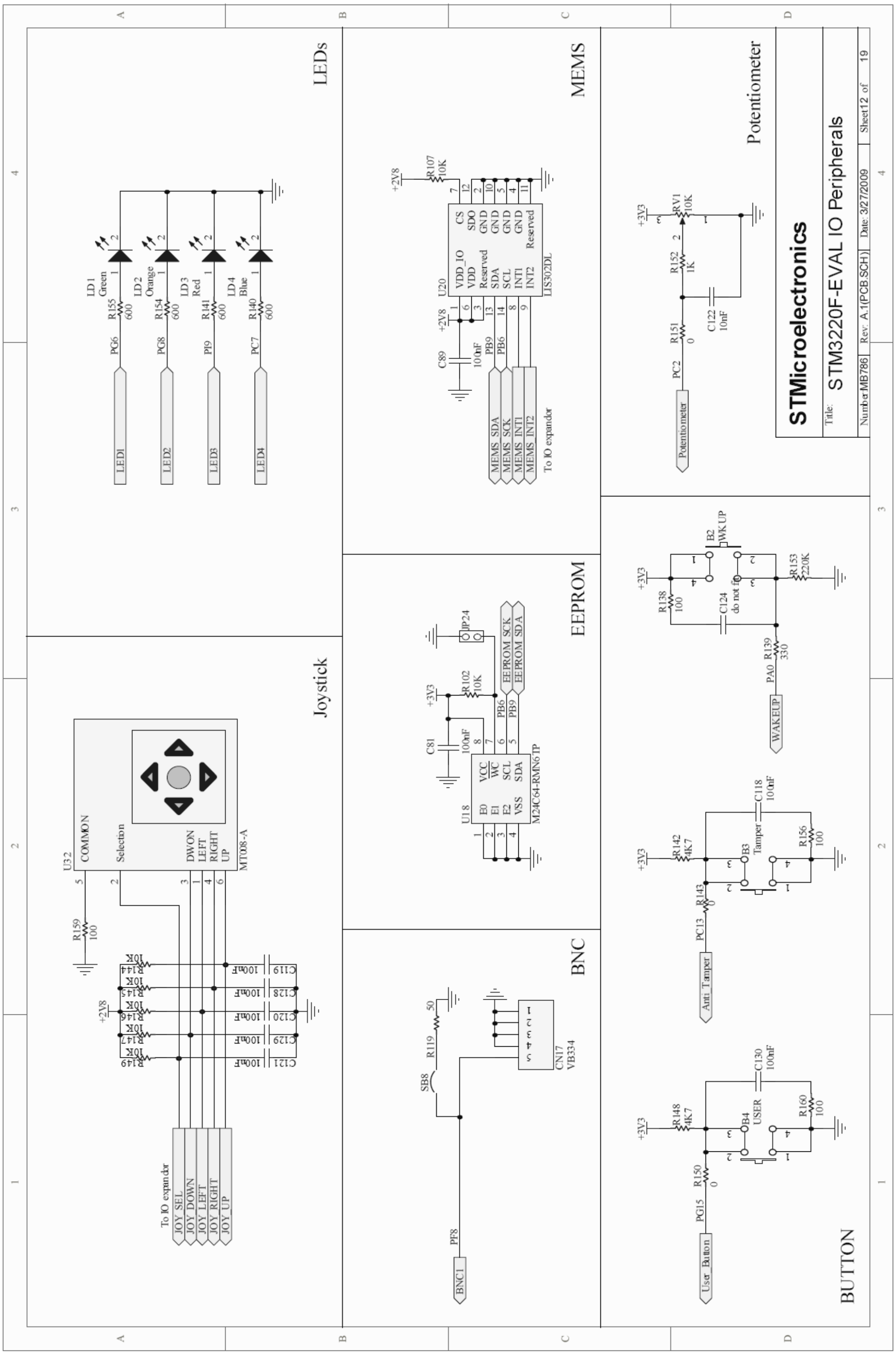

STMicroelectronics
Title: STM3220F-EVAL USB_OTG_FS
Number: MB786 Rev: A.1(PCB.SCH) Date: 3/27/2009 Sheet7 of 19
1. power switch with High active EN pin is used for simple BOM (sample with OTG HS)
2. Short-circuit protection will protect possible 5V power short when board is working as USB device with USB power switch ON due to wrong firmware?
USB_Micro-AB receptacle
STMPS2151STR
USBLC6-2P6
Optional

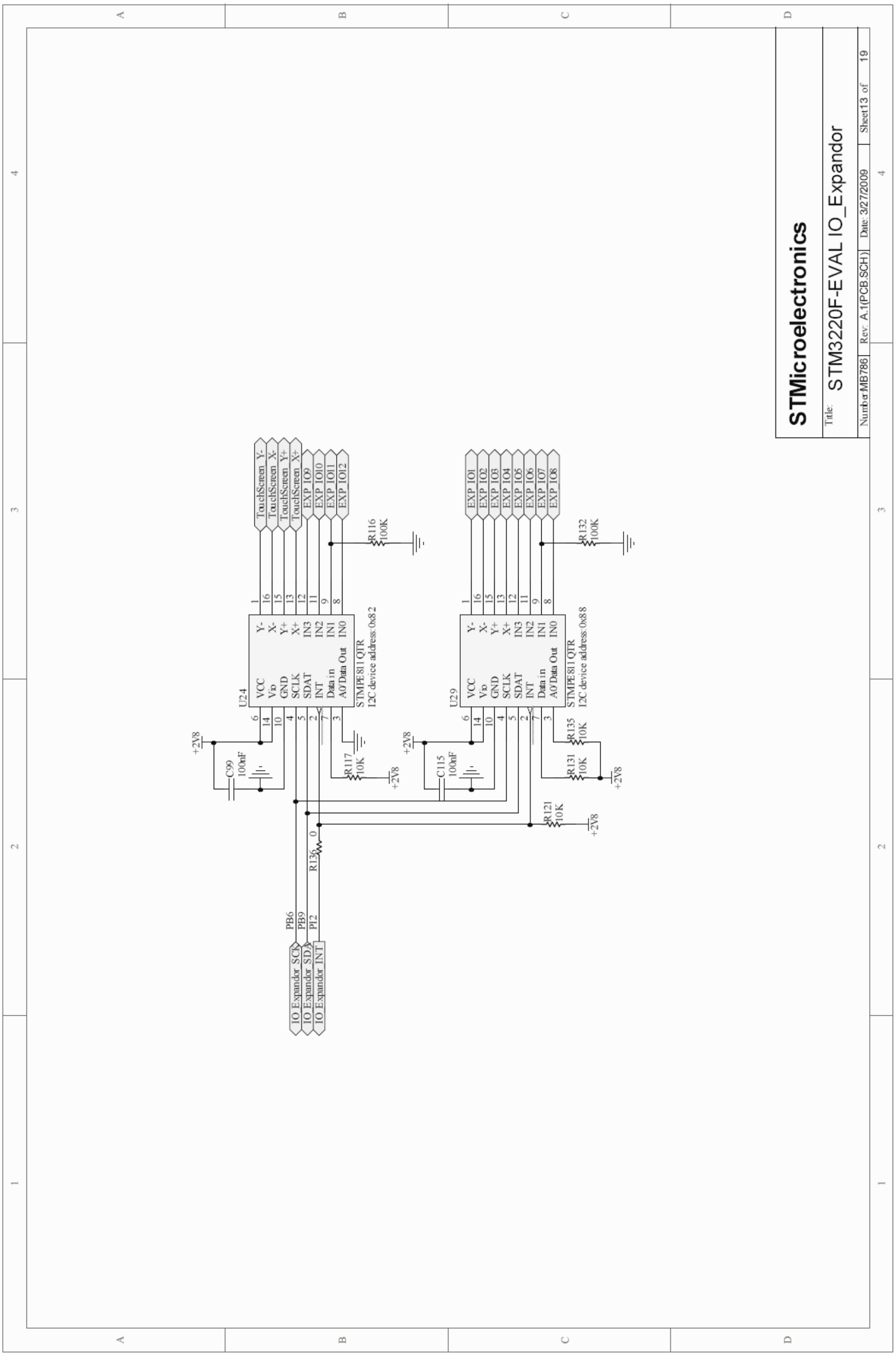

STMicroelectronics
Title: STM3220F-EVAL PSRAM & OneNAND
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet8 of 19
1. TP10, test point of ZZ# pin of Micron PSRAM is removed.
2. OneNAND sync mode on NON-MUX mode timing TBC. Only sync timing on MUX mode is available now in FSMC spec.
U6 IS66WV25616BLL-55BLI
U7 KFG1216U2A-DIB6

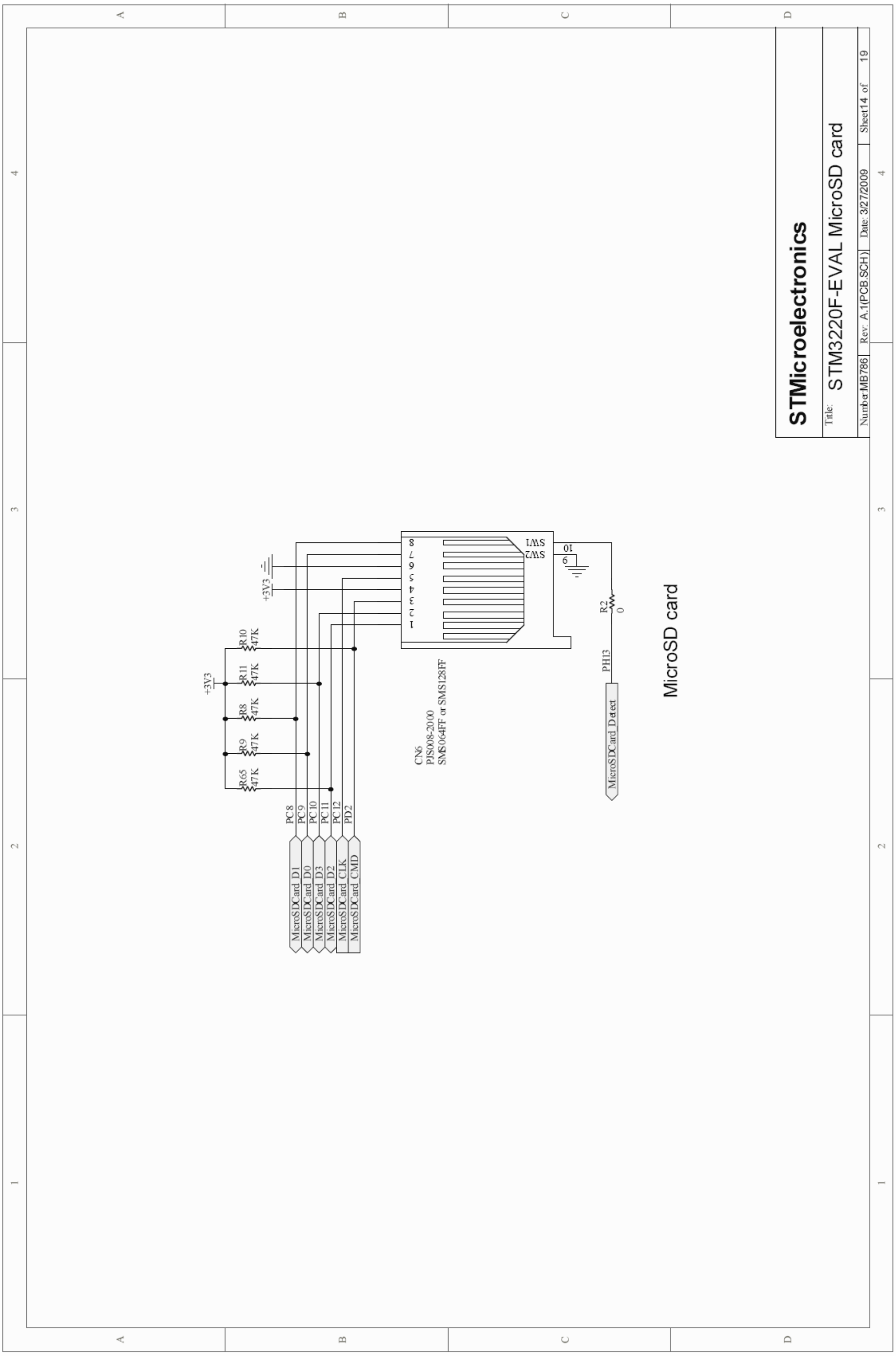

STMicroelectronics
Title: STM3220F-EVAL LCD
Number MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet9 of 19
CN19
3.2" LCD_connector (MB785 with AM-240320D4TOQW-T00H(R))
To IO expandor
TouchScreen X-
TouchScreen X+
TouchScreen Y-
TouchScreen Y+
D[0..15]
A[0..17]
FSMC_NE3
FSMC_NWE
FSMC_NOE
RESET#

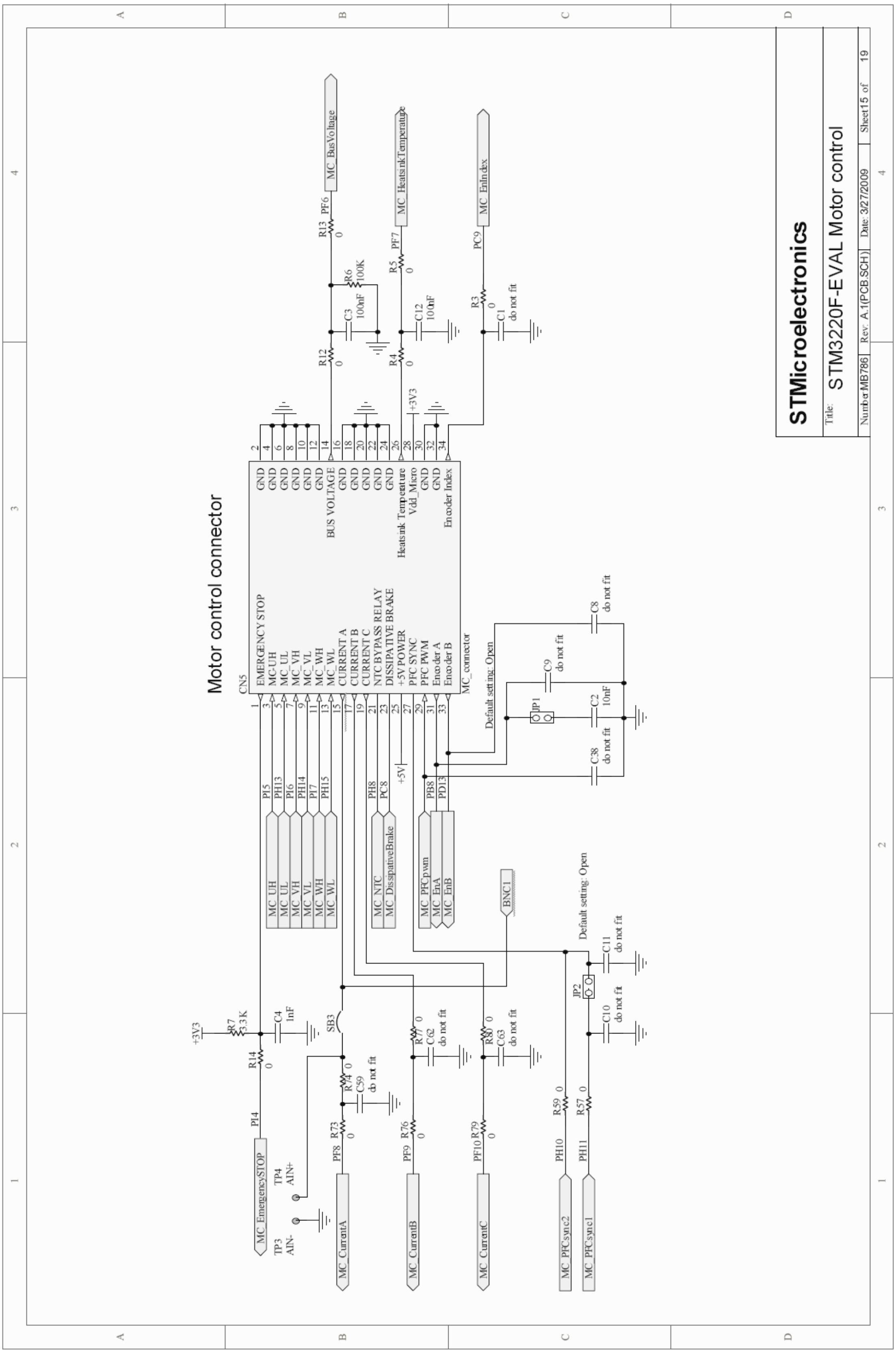

STMicroelectronics
Title: STM3220F-EVAL RS232&IrDA
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet10 of 19
IrDA
U11
TFDU4300
U17
ST3241EBPR
CN16
DB9-male UART2
JP22
RS232/IrDA_TX
RS232/IrDA_RX
Bootloader_RESET
Bootloader_BOOT0
PC10
PC11

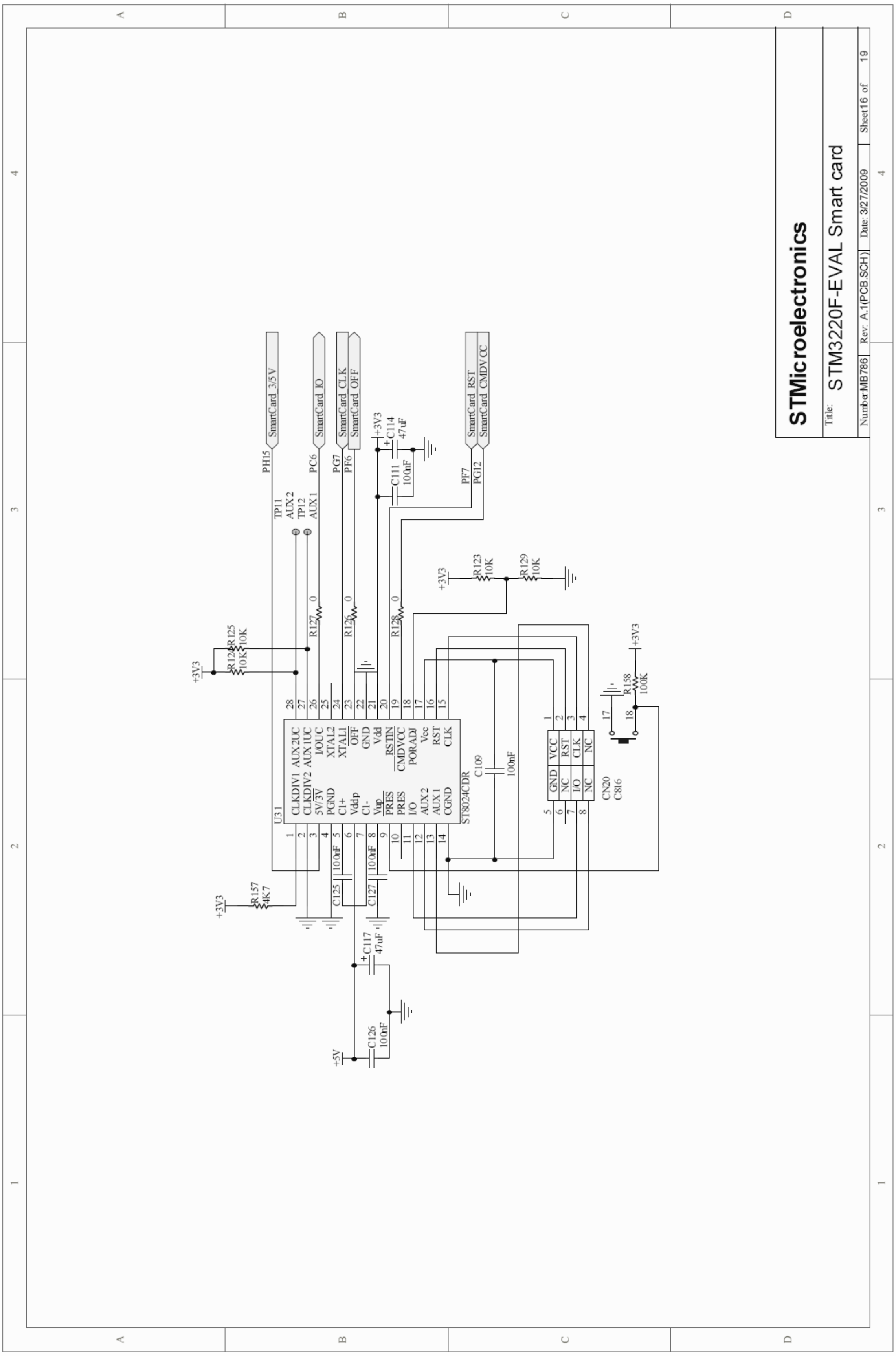

STMicroelectronics
Title: STM3220F-EVAL CAN
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet 11 of 19
CN12
DB9-male CAN connector
CN10
DB9-male CAN connector
Default setting: Open
Default setting: 1<->2
JP13
JP12
JP9
JP7
R67 120
R38 120
R83 do not fit
R56 do not fit
R90 0
R60 0
R68 0
R39 0
R66 10K
R37 10K
R75 0
R51 0
C58 100nF
C32 100nF
U13
U9
SN65HVD230
D
GND
VCC
R
RS
CANH
CANL
Vref
+3V3
PD1
PD0
PB13
PB5
CAN1_TX
CAN1_RX
CAN2_TX
CAN2_RX

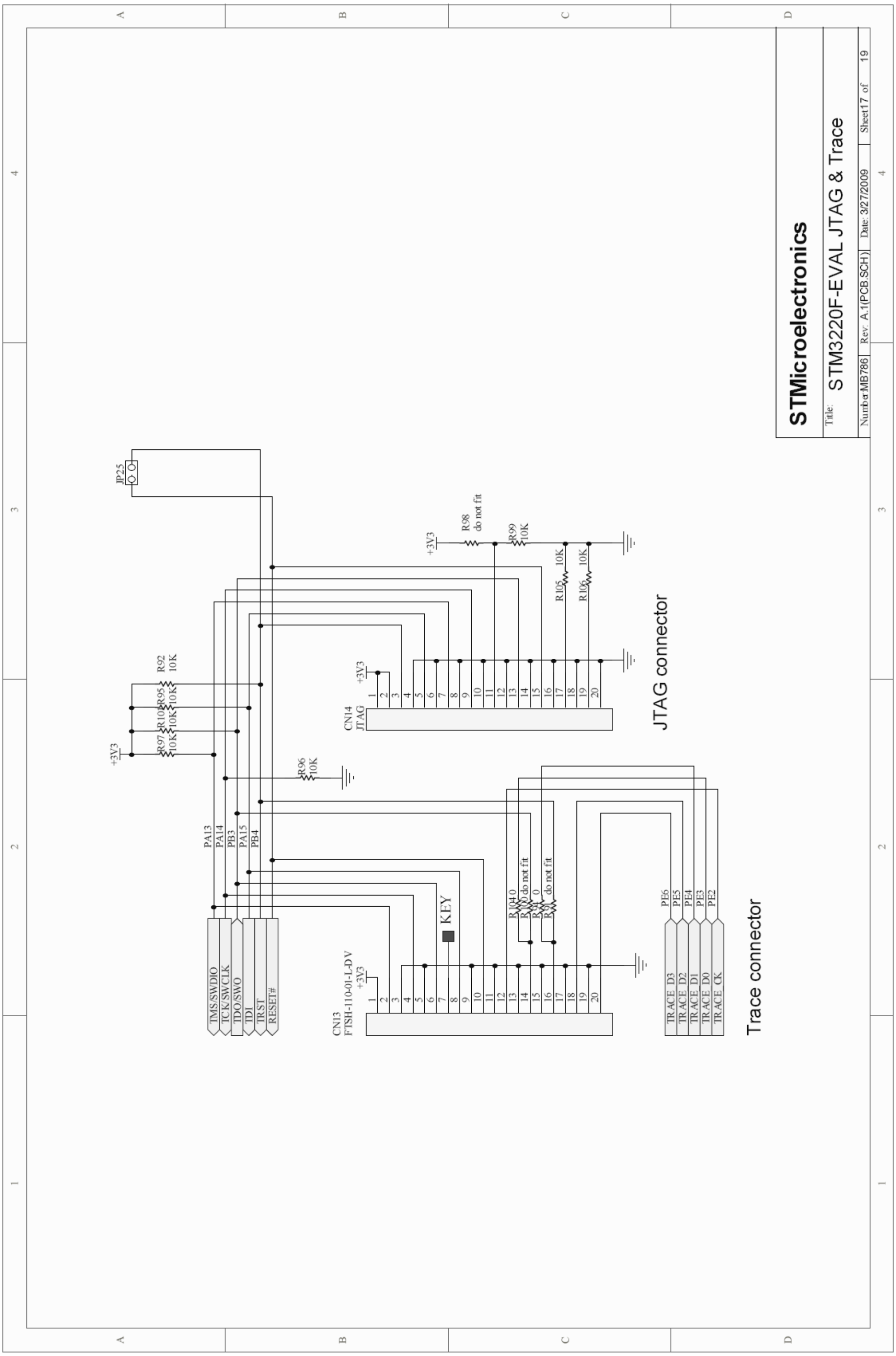

LEDs
MEMS
Potentiometer
Joystick
EEPROM
BNC
BUTTON
STMicroelectronics
STM3220F-EVAL IO Peripherals
LIS302DL
M24C64-RMN6TP
MT008-A
VB334
To IO expander
Sheet12 of 19
Date: 3/27/2009

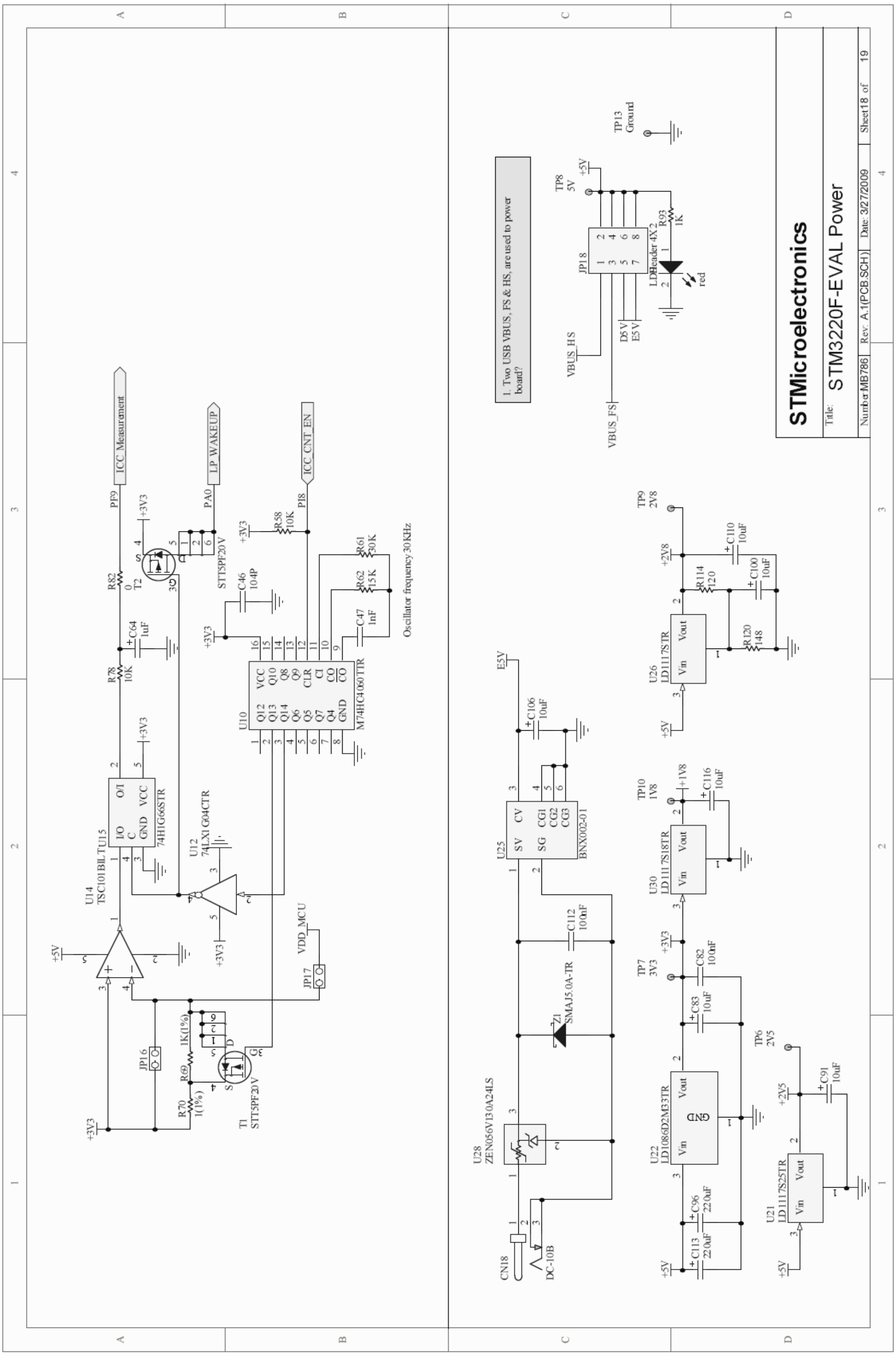

STMicroelectronics
Title: STM3220F-EVAL IO_Expandor
Number: MB786
Rev: A.1(PCB SCH)
Date: 3/27/2009
Sheet13 of 19
U24
STMPE811QTR
I2C device address: 0x82
U29
STMPE811QTR
I2C device address: 0x88
TouchScreen Y-
TouchScreen X-
TouchScreen Y+
TouchScreen X+
EXP IO9
EXP IO10
EXP IO11
EXP IO12
EXP IO1
EXP IO2
EXP IO3
EXP IO4
EXP IO5
EXP IO6
EXP IO7
EXP IO8
IO Expandor SCK
IO Expandor SDA
IO Expandor INT
PB6
PB9
PI2
R136
R116 100K
R132 100K
R117 10K
R131 10K
R135 10K
R121 10K
C99 100nF
C115 100nF
+2V8

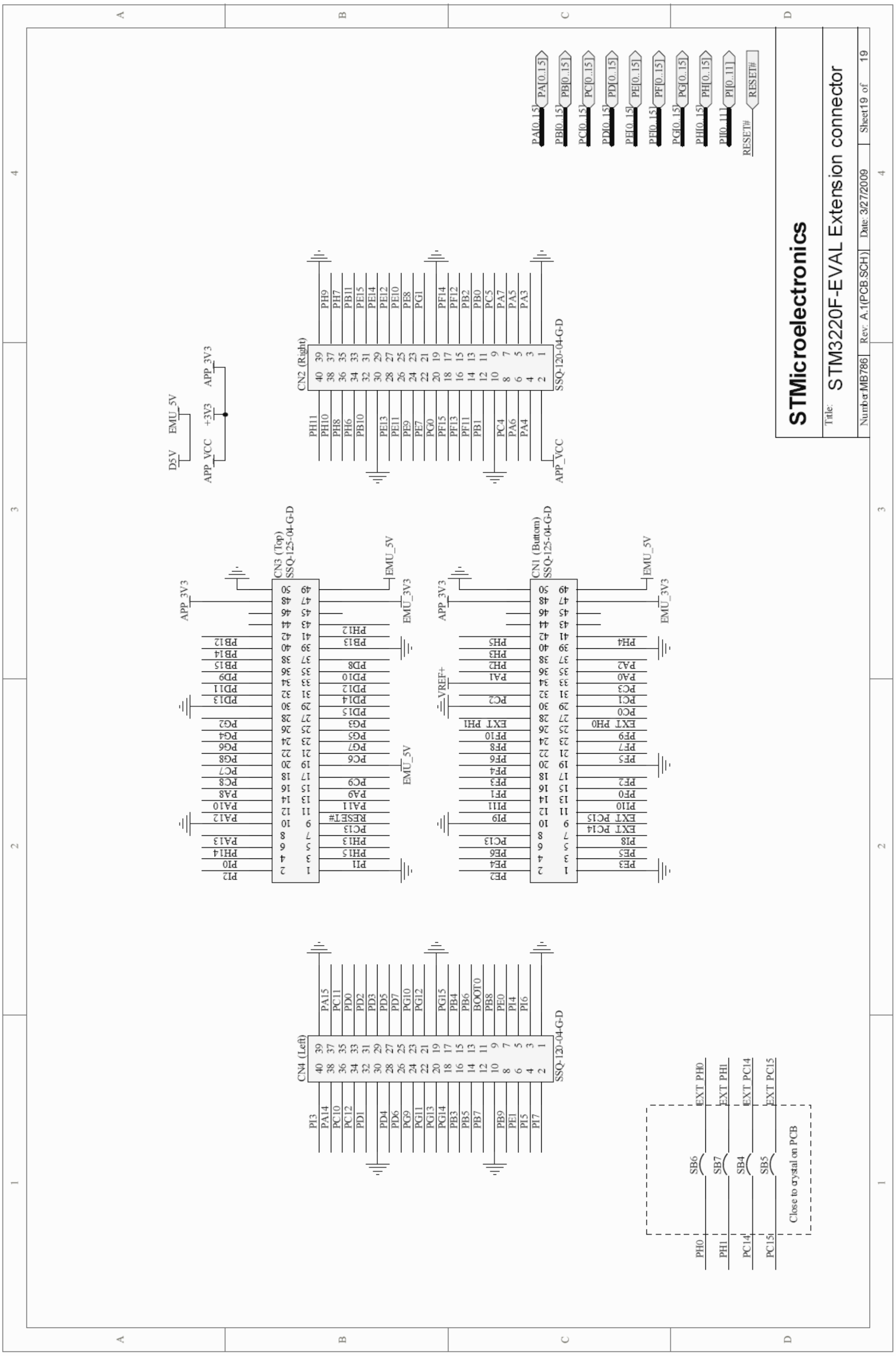

STMicroelectronics
Title: STM3220F-EVAL MicroSD card
Number MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet14 of 19
MicroSD card
CN6
PJS008-2000
SMS064FF or SMS128FF
SW1
SW2
R2
0
PH13
MicroSDCard_Detect
+3V3
R10 47K
R11 47K
R8 47K
R9 47K
R65 47K
PC8
PC9
PC10
PC11
PC12
PD2
MicroSDCard_D1
MicroSDCard_D0
MicroSDCard_D3
MicroSDCard_D2
MicroSDCard_CLK
MicroSDCard_CMD

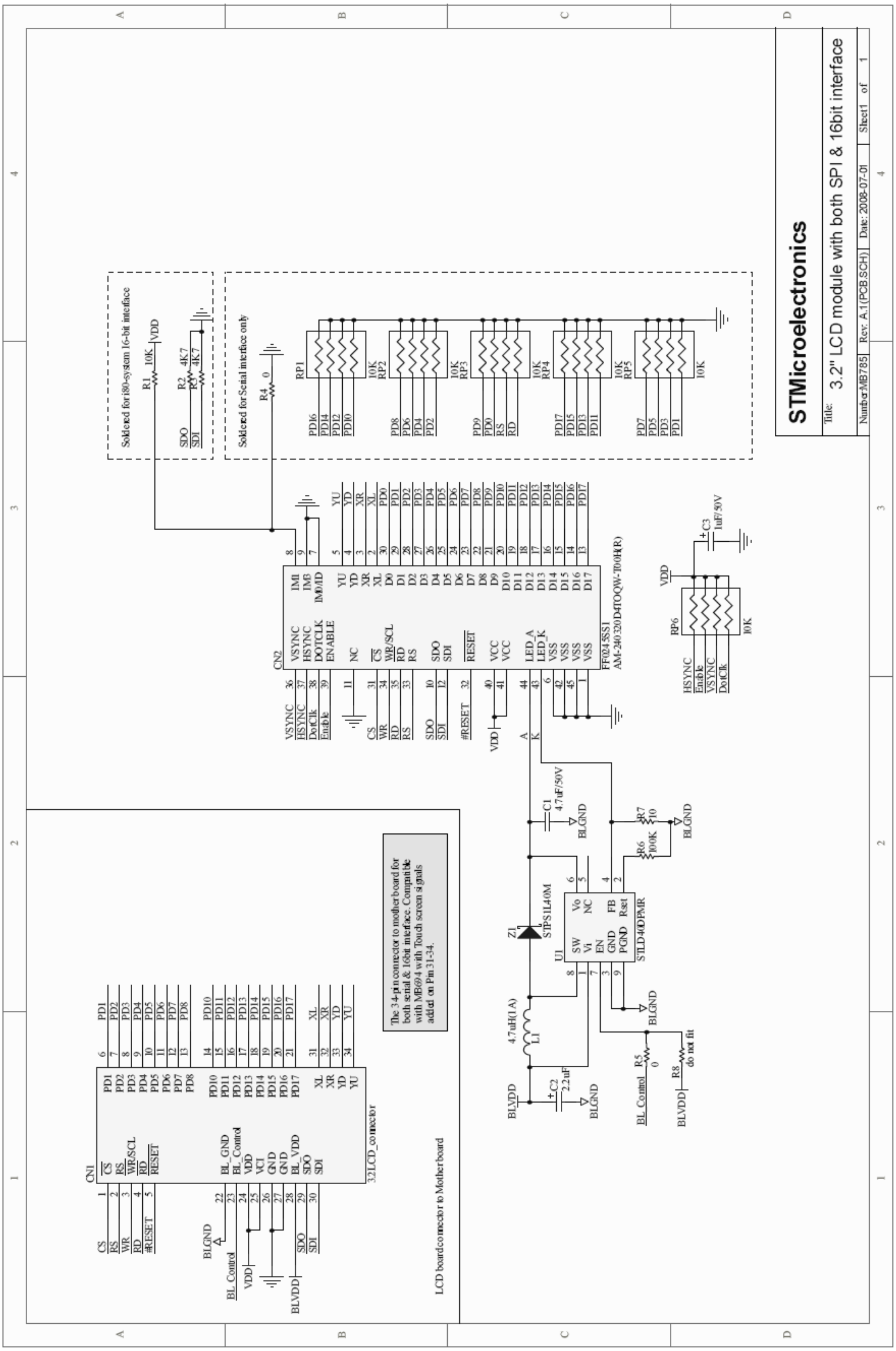

Motor control connector
CN5
MC_connector
EMERGENCY STOP
BUS VOLTAGE
Heatsink Temperature
Vdd_Micro
Encoder Index
Default setting: Open
STMicroelectronics
Title: STM3220F-EVAL Motor control
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet15 of 19


STMicroelectronics
Title: STM3220F-EVAL Smart card
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet 16 of 19
ST8024CDR


STMicroelectronics
Title: STM3220F-EVAL JTAG & Trace
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet 17 of 19
JTAG connector
Trace connector
CN14
JTAG
CN13
FTSH-110-01-L-DV
JP25
KEY
TMS/SWDIO
TCK/SWCLK
TDO/SWO
TDI
TRST
RESET#
PA13
PA14
PB3
PA15
PB4
TRACE_D3
TRACE_D2
TRACE_D1
TRACE_D0
TRACE_CK
PE6
PE5
PE4
PE3
PE2
+3V3
R92 10K
R95 10K
R96 10K
R97 10K
R98 do not fit
R99 10K
R105 10K
R106 10K


STMicroelectronics
STM3220F-EVAL Power
Number MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet18 of 19
1. Two USB VBUS, FS & HS, are used to power board?
Oscillator frequency 30 KHz
ICC Measurement
LP WAKEUP
ICC CNT EN
VDD_MCU


STMicroelectronics
Title: STM3220F-EVAL Extension connector
Number: MB786
Rev: A.1(PCB.SCH)
Date: 3/27/2009
Sheet19 of 19
CN1 (Bottom) SSQ-125-04-G-D
CN2 (Right) SSQ-120-04-G-D
CN3 (Top) SSQ-125-04-G-D
CN4 (Left) SSQ-120-04-G-D
Close to crystal on PCB


STMicroelectronics
Title: 3.2" LCD module with both SPI & 16bit interface
Number: MB785
Rev: A.1(PCB.SCH)
Date: 2008-07-01
Sheet1 of 1
Soldered for i80-system 16-bit interface
Soldered for Serial interface only
The 34-pin connector to mother board for both serial & 16bit interface. Compatible with MB694 with Touch screen signals added on Pin 31-34.
LCD board connector to Mother board
3.2 LCD_connector
FF0245SS1
AM-240320D4TOQW-T00H(R)
STLD40DPMR
STPS1L40M

Appendix A STM3220F-EVAL IO Assignment

Pin No.	Pin Name	STM3220F-EVAL IO Assignment
1	PE2	TRACE_CLK / FSMC_A23
2	PE3	TRACE_D0 / FSMC_A19
3	PE4	TRACE_D1 / FSMC_A20
4	PE5	TRACE_D2 / FSMC_A21
5	PE6	TRACE_D3 / FSMC_A22
6	VBAT	VBAT
7	PI8- ANTI TAMP2	IDD_CNT_EN
8	PC13- ANTI_TAMP	ANTI-TAMPER_BUTTON
9	PC14-OSC32_IN	32K_OSC
10	PC15- OSC32_OUT	32K_OSC
11	PI9	LED2
12	PI10	ETHER_RX_ER
13	PI11	USB_HS_DIR
14	VSS_13	
15	VDD_13	
16	PF0	FSMC_A0
17	PF1	FSMC_A1
18	PF2	FSMC_A2
19	PF3	FSMC_A3
20	PF4	FSMC_A4
21	PF5	FSMC_A5
22	VSS_5	
23	VDD_5	
24	PF6	MC_ADC3_4 pin 14 (Busvoltage) / SmartCard_OFF
25	PF7	MC_ADC3_4 pin 26 (Heatsinktemp) / SmartCard_RESET
26	PF8	MC_ADC3_6 pin 15 (Current A) / BNC
27	PF9	MC_ADC3_7 pin 17 (Current B) / ADC13_IDD_Measure
28	PF10	MC_ADC3_8 pin 19 (Current C)
29	PH0 - OSC_IN	OSC_IN
30	PH1 - OSC_OUT	OSC_OUT
31	NRST	RESET_BUTTON
32	PC0	USB_HS_STP
33	PC1	ETHER_MDC
34	PC2	ETHER_TXD2 / POTENTIOMETER
35	PC3	ETHER_TX_CLK
36	VDD_12	
37	VSSA	
38	VREF+	
39	VDDA	
40	PA0-WKUP	WAKEUP_BUTTON
41	PA1	ETHER_RX_CLK
42	PA2	ETHER_MDIO
43	PH2	ETHER_CRS
44	PH3	ETHER_COL

45	PH4	USB_HS_NXT
46	PH5	USB_FS_POWER_ON
47	PA3	USB_HS_D0
48	VSS_4	
49	VDD_4	
50	PA4	Audio_DAC_OUT
51	PA5	USB_HS_CK
52	PA6	CAM_PIXCK
53	PA7	ETHER_DV
54	PC4	ETHER_RXD0
55	PC5	ETHER_RXD1
56	PB0	USB_HS_D1
57	PB1	USB_HS_D2
58	PB2	BOOT1 /
59	PF11	USB_FS_OVERCURRENT
60	PF12	FSMC_A6
61	VSS6	
62	VDD_6	
63	PF13	FSMC_A7
64	PF14	FSMC_A8
65	PF15	FSMC_A9
66	PG0	FSMC_A10
67	PG1	FSMC_A11
68	PE7	FSMC_D4
69	PE8	FSMC_D5
70	PE9	FSMC_D6
71	VSS_7	
72	VDD_7	
73	PE10	FSMC_D7
74	PE11	FSMC_D8
75	PE12	FSMC_D9
76	PE13	FSMC_D10
77	PE14	FSMC_D11
78	PE15	FSMC_D12
79	PB10	USB_HS_D3
80	PB11	ULPI_D4
81	VCAP1	
82	VDD_1	
83	PH6	ETHER_RXD2
84	PH7	ETHER_RXD3
85	PH8	CAM_HSYNC / MC_NTC_bypass
86	PH9	CAM_D0
87	PH10	CAM_D1 / MC_TIM5_ETR pin 27 (PFC SYNC)
88	PH11	CAM_D2 / MC_TIM3_CH2 pin 27 (PFCSYNC)
89	PH12	CAM_D3 / TIM5_CH3 pin 29 (PFCPWM)
90	VSS_14	
91	VDD_14	
92	PB12	ULPI_D5
93	PB13	ULPI_D6 / CAN2_TX
94	PB14	ETHER_INT
95	PB15	OneNAND_INT
96	PD8	FSMC_D13
97	PD9	FSMC_D14
98	PD10	FSMC_D15
99	PD11	FSMC_A16

100	PD12	FSMC_A17
101	PD13	MC_TIM4_CH2 pin 33 (EnB)
102	VSS_8	
103	VDD_8	
104	PD14	FSMC_D0
105	PD15	FSMC_D1
106	PG2	FSMC_A12
107	PG3	FSMC_A13
108	PG4	FSMC_A14
109	PG5	FSMC_A15
110	PG6	LED0
111	PG7	SmartCard_CK
112	PG8	LED1
113	VSS_9	
114	VDD_9	
115	PC6	SmartCard_IO / Audio_I2S_ MCK
116	PC7	LED3
117	PC8	SDIO_D0/ MC_TIM3_CH3 pin23 (Dissipative Brake)
118	PC9	SDIO_D1 / MC_TIM5_CH3 pin 34 (Index)
119	PA8	MCO
120	PA9	USB_FS_VBUS
121	PA10	USB_FS_ID
122	PA11	USB_FS_DM
123	PA12	USB_FS_DP
124	PA13	JTAG_TMS
125	VCAP2	
126	VSS 2	
127	VDD_2	
128	PH13	MC_TIM8_CH1N pin 5 (UL) / Usdcard detect
129	PH14	CAM_D4 / MC_TIM8_CH2N pin 9 (VL)
130	PH15	MC_TIM8_CH3N pin 13 (WL) / SmartCard_3/5V
131	PI0	Audio_I2S_WS
132	PI1	Audio_I2S_CK
133	PI2	Expander_INT
134	PI3	Audio_I2S_DOUT
135	VSS_15	
136	VDD_15	
137	PA14	JTAG_TCK
138	PA15	JTAG_TDI
139	PC10	SDIO_D2 / RS232_TX
140	PC11	SDIO_D3 / RS232_RX
141	PC12	SDIO_CK
142	PD0	FSMC_D2 / CAN1_RX
143	PD1	FSMC_D3 / CAN1_TX
144	PD2	SDIO_CMD
145	PD3	FSMC_CLK
146	PD4	FSMC_NOE
147	PD5	FSMC_NWE
148	VSS_10	
149	VDD_10	
150	PD6	FSMC_NWAIT
151	PD7	FSMC_NE1
152	PG9	FSMC_NE2
153	PG10	FSMC_NE3
154	PG11	ETHER_TXEN

155	PG12	SmartCard_CMDVCC
156	PG13	ETHER_TXD0
157	PG14	ETHER_TXD1
158	VSS_11	
159	VDD_11	
160	PG15	USER_BUTTON
161	PB3	JTAG_TDO
162	PB4	JTAG_TRST
163	PB5	CAN2_RX / ETHER_PPS_OUT / ULPI_D7
164	PB6	I2C1_SCL
165	PB7	FSMC_NL
166	BOOT0	BOOT0
167	PB8	ETHER_TXD3 / MC_TIM4_CH3 pin 31 (EnA)
168	PB9	I2C1_SDA
169	PE0	FSMC_NBL0
170	PE1	FSMC_NBL1
171	~~VSS_3~~	
172	VDD_3	
173	PI4	CAM_D5 / MC_TIM8_BKIN pin 1 (Stop)
174	PI5	CAM_VSYNC / MC_TIM8_CH1 pin 3 (UH)
175	PI6	CAM_D6 / MC_TIM8_CH2 pin 7 (VH)
176	PI7	CAM_D7 / MC_TIM8_CH3 pin 11 (WH)

Appendix B Document Revision History

Table Document Revision History

Date	Version	Revision Details
09,Apr.2009	**0.1**	First version
28,May.2009	**0.2**	Updated after review and completed with PCB rev A known limitations

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